

# Railway Age Gazette

Including the Railroad Gazette and the Railway Age

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### GENERAL NEWS SECTION.....

\* Illustrated.

JAMES MCCREA died at his home in Haverford, Pa., on March 28. His death, following so shortly after his retirement from the presidency of the Pennsylvania Railroad, is a severe loss to the higher councils of the railroads of the country, as well as to his own board of directors. Coming as it does only about four months after his retirement from a position which lays so heavy a burden of daily labor on the man who occupies it, it is rather tragic evidence of the force of will power that kept James McCrea in the harness almost to the very last. Mr. McCrea's railroad work was commented on in the *Railway Age Gazette* at the time of his retirement. A brief account of the

events of his life is given in another column in this issue. During his presidency of the Pennsylvania Railroad from 1907 to 1912, he devoted his energies to an intensive development of the greatest railroad property in the world, making it possible to reap the benefits of A. J. Cassatt's policy of farsighted expansion and leaving the property enriched and ready for future development.

MANILA is on the other side of the world, but a letter from there, printed in another column, presents a couple of questions that bear very directly on life—railroad life—right here in New York, Pennsylvania and Illinois; also in Arizona, Maine and elsewhere. Our correspondent rightly emphasizes the need of exposing the officer who winks at bad practice. But, to cover the case, his argument should also deal with the negligent or incompetent officer. Winking is an elusive thing; but the officer who knows of misconduct or neglect and does not correct it; and those who do not know, and so cannot take action, may perhaps be classed as all alike. Mr. Scholes' second suggestion is eminently practical. It ought to be carried out by twenty-five railway presidents at once. But usually it is very difficult to formulate in satisfactory shape a charge against the grievance committee which grieves beyond reason, keeping inefficient men in service; and it must be recognized, also, that there is still greater difficulty in making such matters public in a way to benefit the public. But every president would do well to have some cases of this kind formulated for filing in his own office. Putting such cases in systematic shape, as a district attorney would do if he expected to prosecute them in court, would be a very useful service. It would be a great benefit to the railway world if a hundred examples of bad labor-union influence could be aired, in the way that the railway presidents of New York state have this week aired the bad labor-union influence in the matter of the full-crew bill.

THE full crew bill went through the New York legislature regardless of all protests and by the governor's approval is now a law. Governor Sulzer held a hearing and most of the principal railway presidents appeared and showed him the utterly irrational character of the proposition, but all to no effect. It is proper to remind people outside of New York State that nearly all reasonable measures fare this way in the Albany legislature this year. Tammany Hall controls the legislature and the governor seeks popularity with "the masses." He went through the form of respecting public opinion by filing with his approval of the bill an explanatory memorandum, but in this he only stultified himself by accepting the brotherhoods' claim that the presence of the extra brakeman would add to the safety of employees, a claim for which, under the railway managers' challenge, the labor leaders were unable to bring even a shadow of reasonable foundation. The governor's other reasons were weaker even than this one. The people of the country now have before them three shining examples of the drift of public opinion. In the matter of valuation of railway property the country is willing to approve an expenditure of from two to ten millions for the purpose of proving technically, what is already proved morally, that the railways do not use false figures of capitalization for the purpose of extorting high rates for carrying freight. In the arbitration of firemen's wages the public—as represented by the press—weakly allowed the railways' demand for three or five impartial arbitrators to go unheeded because, forsooth, a matter of a few million dollars' loss from the railways' treasuries was less important than to sustain "labor" in its extraordinary respect for "law" as embodied in the makeshift Erdman act. And now the appeal of the New York railroads to be saved from a useless expenditure of \$2,000,000 annually is contemptuously ignored for no other reason, really, than that the politician is in duty bound to favor the side which controls the most votes. This last is the underlying reason in all these examples, of course.

IN compliance with the recommendations of the Interstate Commerce Commission and the Public Utilities Commission of Connecticut, the New York, New Haven & Hartford has ordered the lengthening of 78 crossovers to No. 20 in addition to similar lengthening of 12 important switch leads not included in crossovers on its main line between New York and Boston. Besides the actual track work incident to the replacing of the frogs and the lengthening of the switch leads, this will necessitate the rebuilding of 36 interlocking plants. This work will cost \$750,000, with an additional outlay of \$350,000 for changes in signals, or \$1,100,000 in all, which is at the rate of nearly \$5,000 per mile of line. If this large expenditure would really insure safety to trains passing through turnouts at high speeds, it would be justified and would receive the approval of all railway men. But, this is not the case in spite of the popular belief based upon statements of the Connecticut commission that a No. 20 crossover is safe for high speeds. Railway engineers fully realize the fallacy of this idea. It will still be necessary to reduce speed through the No. 20 crossovers, although not to the same extent as through No. 15 crossovers. When engineers disregard signals and attempt to pass through turnouts at speeds such as resulted in the two recent accidents on the New Haven, accidents are certain to occur as they did on the shorter turnouts, and may be more serious, for with the higher speeds permitted in operation over long crossovers the risks in case of disregard of signals are greater. Contrary to general belief, the benefit derived from these longer crossovers will not be so much an increase in safety as an increase in regularity of operation due to the possibility of maintaining higher normal speeds through the crossovers. Whether this advantage will justify the cost is doubtful.

UNIQUE is the concern or class of concerns that does not today feel the teeth of the muckrake and the lash of the reformer. The chief promoters of the current nation-wide movement for the regeneration of business are the newspapers and magazines. The main objects of their oburgations and condemnations have been the railways and other large corporations. When the corporation managers have been disposed to remind the publishers and editors that reform, like charity, should begin at home, many of our esteemed contemporaries have in effect retorted that their case was different from that of the railways, as they are engaged in a purely private business. The public shows an inclination to take a different view; and at Denver a "Citizens' Protective League" has been formed to suppress "vicious journalism" in Colorado. It includes two ex-mayors, the president of the Rotary Club, the president of the Real Estate Exchange, the president of the Ministerial Alliance, the president of the Denver Bar Association, the president of the Denver Women's Club, and numerous other persons prominent in the business, professional and social life of the city, and it has issued a pamphlet bitterly denouncing the local newspapers and saying that it intends to wage war until they are reformed. One of the planks in its platform sets forth that "fake stories, misrepresentations and exaggerations of all kinds should be eliminated." The *Railway Age Gazette* has no special comment to make on the newspapers of Denver. It would seem, however, that every good citizen not only of Denver, but of the United States, might well subscribe to the plank quoted and join a crusade to make American publishers and editors live up to it. It has come to pass that "fake stories, misrepresentations and exaggerations of all kinds" are served up by many newspapers as the staple of daily "news;" and the railways of the United States have been among the greatest sufferers from this practice. Among the very worst sinners against decency and truth are the class of newspapers and magazines that hold up the highest standards for railway officers and other business men; and the very biggest liars of all are the professional muckrakers. The public should apply to the press the same standards of honesty, fairness, good service and good citizenship that the press has successfully insisted on having applied

to public service corporations. When rebating prevailed most railway traffic men wanted to obey the law against it, but were driven into breaking it by their unscrupulous competitors. A majority of publishers and editors are in the same relative position now that most railway traffic managers were then. They would prefer not to fill their papers with the sensational and the false, and would welcome a reform; but in the newspaper as in the railway business, the effective pressure for reform must come from the public. As no class of men or concerns has suffered more from yellow journalists and journalism than railways and railway officers, so none will more heartily welcome any movement that may tend to abate them.

#### J. P. MORGAN.

PROBABLY the three men who have exerted the most influence on the development, operation and financial results of the railways of the United States have been James J. Hill, E. H. Harriman and J. P. Morgan. Each of them has exerted an influence, having various phases. Yet the influence of each has had a distinctive character. Mr. Hill has done the most to teach railway managers how to develop the natural resources of their territories and to operate economically. Mr. Harriman's characteristic work was the taking of physically moribund properties and developing them into highly efficient transportation machines. Mr. Morgan's great work was that of teaching—and sometimes compelling—railway managements to conserve their resources by living in peace with each other instead of mutually destroying one another by wasteful, cut-throat competition.

Mr. Morgan, whether dealing with industries or railways, was first, last and all the time, what he always termed himself, a banker. In that capacity he invested other people's capital. Having invested it, he felt a heavy responsibility for seeing that they profited by their investment. Many millions of early investments in railways were destroyed by competitive construction and rate-cutting. Such competition did few people any good, and many besides investors immense harm. Having, in his capacity of a banker, become interested in the welfare of various railways, Mr. Morgan resented and opposed the destruction of values resulting from excessive competition; and many years ago he was largely, if not chiefly, instrumental in bringing about the early "community of interest" arrangements—arrangements that restrained competition by the device of securing for rival railways ownership of more or less of each other's stock and representation on each other's boards. From then to the time of his death Mr. Morgan's influence in the affairs of the railways of the United States was not only one of the most potent, but one of the most salutary. It was potent, not so much because his own direct financial interest in the railways was large—although it was—not so much because the financial interest in them which he represented was great—although it was very great—but because his direct and indirect financial interests were reinforced by a mighty intellect, a powerful will and a reputation for immovable integrity—an intellect, a will and an integrity which inspired the greatest confidence in investors in all classes, and which thereby became the cause and secret of his enormous power.

His power, like that of all great men, in whatever line, was the power of a personality. It was his personality that commanded men's confidence; and it was men's confidence that enabled him to become the possessor, and far more the representative, of a large capital. He insisted on being paid well for the services he rendered in reorganizing railways and other concerns, and putting them on a stable basis; but his aggregate compensation was a drop in the bucket compared with the enormous amounts that his organizing ability and his conservative, honest influence added to the wealth of the United States.

The power of a responsibility dies with its possessor. There will be no successor to J. P. Morgan. Fortunately, conditions in the railway field are now such that it apparently needs no



successor to him. The day of cut-throat competition and financial legerdemain in railway affairs seems to be past. The work of Mr. Morgan and his associates and public regulation have together made them impossible in future. The very fact, that in the transportation field at least, Mr. Morgan needs no successor is perhaps the highest tribute to his ability, integrity and personality, and the wonderful influence they exerted—an influence for good that will continue to be felt for many, many years.

#### MORAL CHARACTER IN THE ADMINISTRATION OF DISCIPLINE.

**I**N selecting trainmasters, roundhouse foremen, road foremen of engines, master mechanics and other officers who are to be the superintendents of the future, a railroad manager should put a premium on integrity of personal character. This pregnant truth was forcibly set forth by a Southwestern superintendent of long experience, in our issue of March 7, page 425. In a private letter he stated the case even more strongly; he would sacrifice experience, if need be, to make sure of high moral character. And in the letter published (page 426, near the bottom of the first column) he indicates that this sacrifice may not be a great detriment after all. Men of strong moral character learn the essentials of the railway profession quickly. In the railway world, the worship of experience has become so general that the word is really a dangerous shibboleth. It is high time that the other side of the truth were given more attention.

The New York report, to which our correspondent referred, points out two important features, in some respects the most important, in the "character" which is so vital an element in efficient railway operation; (a) justice, (b) fearlessness. The division officers referred to should be "capable of dealing justly and fearlessly" with their subordinates; and "the authority of these officers should be sustained by the officers above them; they should be secure in their positions." (*Railway Age Gazette*, January 17, p. 105.)

Any one interested in these matters will confirm the view here expressed, from his own observations and experience. The foreman who knows nothing but his machinery has a constant deadening influence, and the officers who have made or approved his appointment, soon regret their choice. His mistakes with the employees may be due either to prejudice and favoritism or to mere weakness as a manager; the result is much the same, either way. The foreman, on the other hand, who is fair minded and courageous, but not good in the technical part of his work will have much to learn, and will make mistakes; but he will correct the mistakes, if he sticks to the job, and the value of his moral qualities will be such a constant satisfaction to the higher officers, in the relief that they will experience in dealing with appealed questions of discipline and efficiency, that they will, if they are wise, give ample opportunity and assistance for the correction of mistakes. In short, if the man who is strong minded and high minded can once get over the period of ridicule, outspoken or covert, which is the lot of all who enter a railway office without the time-honored certificate of "experience," he has the opportunity, in the positions which we are here considering, of a most useful and honorable career.

We have said that justice and courage must be the two chief ingredients in the ideal officer's mind and conduct. For all practical purposes, we may simplify our theme by concentrating attention on courage alone. The elements of justice are so well known and the rules for their application so easily mastered, that no one need have much difficulty with this part of his problem. There is not much trouble in seeing the issue. The courage to do what is clearly seen to be needed is the final desideratum. We are not going into a general dissertation on how to cultivate courage. Every one will agree, however, that our correspondent has pointed out one of the first fundamentals of courage in the administration of discipline when he shows the need of a clean moral life. Another thing in this connection, quite obvious, perhaps, yet needing reiteration, is that the prin-

ciples of character referred to apply in many small things, as well as great. The operating officer needs these qualities not alone in dealing with gamblers or drunkards, but in countless other situations. Such commonplace faults as laziness, petty dishonesty and concealing bad practices demand of the officer the constant exercise of moral strength, wisdom and all the fundamental virtues—courage in its highest form.

The letter of a New Mexico correspondent in this issue, telling of favoritism and poor judgment, furnishes another "exhibit" which goes well with our present topic. Favoritism is injustice, when it impairs the efficiency of train service so as to make lives and property less secure; and, as everybody knows, there are many obscure and apparently small weaknesses in train-service discipline which directly, if not visibly, affect the safety of trains. Favoritism, of this kind described by "M. M." is not confined to New Mexico. This letter may also appropriately be considered in connection with that of March 7, before referred to, because of the different aspect of the same question here presented. In the earlier letter we are reminded that on occasion it may be well to choose (for example) a trainmaster who cannot be marked 100 per cent. in all the details of railway operation; the candidate may be so desirable on other grounds that this point can be waived or modified. In the letter of "M. M." on the other hand, we are shown cases where men were appointed who seem to have lacked both the experience and the necessary strong moral qualities. A situation like this need not confuse the issue. First-class men are not always easy to find, whether one looks for experience or looks for character. The only sure way to get either, of a satisfactory quality, is to begin early enough to be able to train young men for a period of five years or more in your own service. The ideal officer is the one who stands high in both of the respects here referred to, and the railway that is so fortunate as to have trainmasters and foremen of this kind should see that their younger employees are trained, as effectively as possible, to imitate the ideal.

We have been speaking chiefly to division superintendents. Any individual superintendent can carry out these universally-approved principles. We are not telling him anything new, only calling attention to things which he knows already. His success will be measured by his physical and mental strength and his independence of character. But whether in New Mexico or Missouri, New York or Montana, the cure of the defects which are here discussed will be noticeable and widespread only as some general officer sets things agoing.

#### NEW BOOKS.

*Digest of the Decisions Under the Interstate Commerce Act.* Compiled and published by Herbert C. Lust and Ralph Merriam of the Chicago Bar. 1100 pages. 6 in. x 9 in. Buckram. Price, \$8.

This volume is a continuation of the Digest compiled and published in 1908 by E. B. Peirce, late general solicitor of the Rock Island Lines, which covered the decisions from 1877 to 1908, and covers every case arising under the Interstate Commerce Act from January 1, 1908, to date. Every point of fact and law arising in these cases since that time has been digested in full, including all decisions of the Interstate Commerce Commission (reported and unreported) and of the various United States and state courts. The need for such a compilation is felt not only by lawyers engaged in traffic cases, but by railroad and industrial traffic men, members of state and interstate commissions, students of and writers on railroad subjects, and all who are interested in traffic matters. The book is arranged alphabetically according to such subjects as are the ordinary and accepted divisions in which the principles governing interstate traffic would naturally classify themselves, as indicated by a Table of Contents, covering about 10,000 points of traffic law, which occupies 31 pages. All the cases on any one point are grouped together and frequent cross references are inserted to points which may not be logically classified under a particular heading, but may nevertheless have some bearing on it. In all

cases where it is possible to do so, a so-called "fact point" has been made. These fact points show tersely, but completely, the evidence on which the Interstate Commerce Commission or the court bases its decision in the particular case. The authors have attempted to summarize in easy, readable style ton-mile revenues, distances, commodities, rate comparisons and other evidence presented in the particular cases. Not only, therefore, have the traffic principles been classified, but also the economic principles and facts governing each particular case.

The decisions are arranged chronologically under each section, the most recent decision being placed first. If the decision of the Interstate Commerce Commission has been modified or reviewed by any court, rehearing denied, or dissenting or concurring opinion filed, such fact is noted. At the back of the book are indexes to the cases, commodities and localities involved. A reader interested in any particular case, by referring to the index, will find references to every page of the book on which that case is mentioned, and also references to the fact points on each case.

*Practical Locomotive Operating.* By Clarence Roberts, Assistant Road Foreman of Engines, Pennsylvania Railroad, and Russell M. Smith, Air Brake Instructor, Pennsylvania Railroad. Bound in cloth, 292 pages, 6 in. x 8 1/4 in. 92 illustrations and 5 inserts. Published by J. B. Lippincott Company, Philadelphia, Pa. Price \$2.

This book is intended for the use of locomotive engineers and firemen, its specialty being the running, firing and care of locomotives in service. No attempt has been made to go into the questions of design and shop repairs, and where formulas are used they are given as briefly as possible, without any involved mathematics. No attempt has been made to describe the air brake system or its operation, the authors leaving that subject to those books which are devoted entirely to it, and no description of appliances which are in experimental use only is included in the book.

Part one deals with horse power, tractive effort, train resistance and locomotive efficiency. Part two takes up the systems of locomotive classification most in use and gives illustrations of prevailing types, with tables of dimensions and characteristics. Part three is devoted to useful notes and tables, and deals briefly with such subjects as physics, mechanics and chemistry. Part four considers steam and its properties, saturated and superheated. Part five deals with boilers and related devices, while part six covers the subject of lubrication. Part seven takes up cylinders, valves and valve gears. Part eight deals with the running and firing of locomotives, part nine with disorders and breakdowns, and part ten with parts and appliances, such as injectors, lubricators, etc. Part eleven is devoted to qualifications and responsibilities and deals with operating conditions, selection of engineers and firemen, etc., and concludes with a series of questions on the locomotive. Part twelve gives a summary of the federal laws pertaining to locomotives. The book is well printed and the illustrations clear.

*The Practical Railway Spiral.* By L. C. Jordan, principal of civil engineering department, Hefley Institute, Brooklyn, N. Y. 4 in. x 7 in., 155 pages, illustrated, leather binding. Published by D. Van Nostrand Co., 25 Park Place, New York. Price, \$1.50.

The author states in his preface that "The Practical Railway Spiral" is intended to clear up and modify the theory and to eliminate the existing inconsistencies of spiral curves. It has been his aim to secure a curve which approaches as closely as possible the perfect easement, which is complete in theory, simple and practical in construction, elastic in its adjustment to speed and curvature and readily applicable to all classes of location and revision work. There are no approximations in the theory and development of this spiral. The book includes tables showing deflection angles for four different lengths of spirals for all degrees of curvature ordinarily employed. Spirals for other degrees may be worked out from the formulæ included in the development of the spiral.

## Letters to the Editor.

### PUBLICITY AND DISCIPLINE.

MANILA, February 17, 1913.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

There is no doubt but what most railway men will endorse what Mr. Kruttschnitt, of the Union Pacific and Southern Pacific, has to say in reference to the value of publicity in increasing safety on railways, as quoted in your issue of December 27; but there lurks in one's mind the feeling that, on one important side of the question, he has not laid much stress. That is, the joint responsibility of the subordinate officer for an accident caused by disobedience of a rule, when, to use your own phrase, he had "for a long time been winking at chronic disobedience of exactly the same kind," and the concurrent responsibility of the executive officer who does not take steps to ascertain whether his subordinates are winking at chronic disobedience of the rules. It is all right to spare "neither talent, time nor money" to place the responsibility on the flagman or brakeman who has been derelict in his duty, but why stop the light of publicity at that point? The public is loath to condemn the employee too severely for a disastrous failure to observe an operating rule when it has a suspicion that his superior officer has made no effort to enforce compliance with that rule and may even have encouraged him in its violation in the past. The officer is paid a higher salary than the flagman, presumably because he is a man of greater intelligence and ability; and in the case of an accident due to the failure of both to do their duty, the public is apt to place the larger share of responsibility on the man who is supposed to have the greater intelligence.

There is another direction in which publicity would tend to increase the safety of transportation on railways. That is, the full and complete publication of *specific instances* where labor unions or other organizations have prevented or attempted to prevent the proper administration of discipline in the case of flagrant violations of the rules, whether accident resulted therefrom or not.

The first duty of the Safety First Committee is to ascertain the state of discipline on each division, as measured in terms of daily obedience to orders and compliance with the rules of operation, *before* the accident, not after.

R. T. SCHOLES,

Inspecting Engineer of Railways, Department of Commerce and Police, Government of the Philippine Islands.

### JACOBS-SHUPERT BOILER TESTS.

URBANA, Ill., March 27, 1913.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

My attention is called to an editorial discussion appearing in your issue of February 28, under the title of "The Jacobs-Shupert Boiler Tests." This discussion is based on certain facts presented by me in a formal report rendered the Jacobs-Shupert United States Firebox Company. The article presents diagrams in which the coal burned and the water evaporated are plotted in terms of draft. It appears from these diagrams that for a given draft, both the weight of coal burned and the weight of water evaporated are less for the Jacobs-Shupert boiler than for the radial-stay boiler, and it is concluded that "if this were to hold it might mean that, while boiler efficiencies were the same, there would be a great reduction in engine efficiency [in the case of the Jacobs-Shupert boiler] as a direct result because of the increase of back pressure required to maintain the heavy draft."

In further discussion of the question thus raised, I would say, first of all, that the presentation of data set forth by your editorial is entirely correct, and the spirit with which the author approaches the discussion is a matter which I greatly appreciate. The defect in the presentation arises from the fact that the data do not sustain the conclusion.



Draft values are sensitive to a variety of influences. For example, increasing the thickness of the fire normally increases the draft, all other things, including the energy of the exhaust jet, remaining the same. Differences in damper areas are at once reflected in the draft values. Neither of these is a matter of general application in a study of boiler efficiencies, except as it must be taken into account in analyzing the data.

In preparing the Jacobs-Shupert and radial-stay boilers for the comparative tests referred to, every precaution was taken to have

the diaphragm. As it was not the plan of the tests to make the front end arrangement a detail receiving especial attention in the study, all of the comparisons presented in my report are properly based upon draft values as observed behind the diaphragm. The experimental data rightly interpreted contain nothing which suggests the inferiority of the Jacobs-Shupert boiler as compared with the radial-stay boiler.

W. F. M. GOSS,  
Dean and Director, College of Engineering and Engineering Experiment Station, University of Illinois.

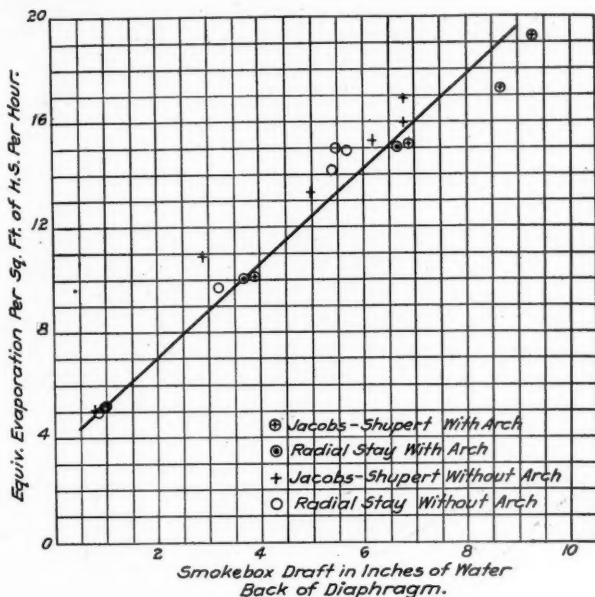


Fig. 1.

the openings under the grate of equal area for both boilers. In the attempt to maintain equal thicknesses of fire, the same fireman served for both boilers. It was intended to have the diaphragm in the front end of the boilers set to provide an equal area under them; but it happened that in some inexplicable way, the diaphragm in the front end of the Jacobs-Shupert boiler was set lower than that in the radial-stay boiler. Evidences of this will be seen by comparing the draft values in front of the diaphragm with the draft values behind the diaphragm for both boilers. If

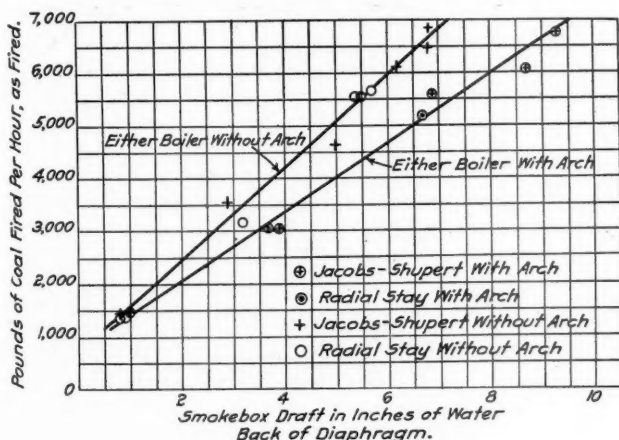


Fig. 2.

in your editorial study, comparisons had been based upon draft value as observed behind the diaphragm instead of those observed in front of it, the performance of the Jacobs-Shupert boiler would not have appeared inferior to that of the radial-stay boiler. Such a comparison is shown by Figs. 1 and 2 accompanying. These figures are similar to those presented in the editorial discussion, except that the draft values are those observed behind the diaphragm. Obviously, the difference in the comparisons made by you and those presented herewith merely discloses the effect of

## EVILS OF FAVORITISM.

NEW MEXICO, March 15, 1913.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The article published in the *Railway Age Gazette* of January 17, in regard to the wreck at Corning, N. Y., and especially the statement that there should be greater care exercised in the selection of roundhouse foremen, traveling engineers and trainmasters, must have impressed every well-informed reader.

While we are preaching safety let us remember that though the employees can bring about wonderful improvement by exercising greater care, still the railroads themselves—the officers “higher up”—must put their shoulders to the wheel if they ever expect to accomplish the results desired.

No one disputes that we have in our railroad service a lot of big, brainy, broad minded, capable officers at the helm. But at the same time it is impossible to conceive of any set of men at the head of our large financial and mercantile institutions making selections of heads of departments as these selections are made in railroad work. A bank president would not be selected because he had merely served as paying teller, nor would a man be chosen for the managership of a large wholesale house because he had worked a few years in the shoe department.

In regard to roundhouse foremen: This officer, if, happily, he be a good one, should be highly prized. But, getting right down to brass tacks, how many really good roundhouse foremen are there in the country today? This is one of the most trying positions. Before a man is considered competent to fill it he must have served at least four years as machinist apprentice. The natural inference then is that he worked several years at the bench, as gang foreman and possibly as assistant roundhouse foreman before he finally becomes roundhouse foreman. It is, therefore, safe to say that he has spent at least ten years fitting himself for a roundhouse foremanship; and when the time comes he is “promoted” to such a position at the munificent salary of, say, \$115 a month, which is much less than he could earn working at the trade. But, on the other hand, some dude who wears kid gloves, a high collar and a \$40 suit of tailor made clothes, and whose entire railroad experience consists of three or four years spent in an office, is promoted to the position of transportation inspector, trainmaster, or something else, at a salary of from \$125 to \$200 a month. Lots of consolation in this for the poor roundhouse foreman, isn't there?

Now, the traveling engineers. Generally speaking they are men of a high order of intelligence as, in selecting men to fill such positions the brighter men among the runners are chosen. They are at least practical men, and this is more than can be said of a great many who are filling other official positions on our railroads. But, at the same time, it is a well-known fact that many of these traveling engineers were not a brilliant success when they were running engines. How, then, can they be expected to be successful as traveling engineers?

The selection of trainmasters is a most important matter. On a certain road five trainmasters were formerly chief dispatchers; two others had been chief clerks to general superintendents and had never put in a day's practical experience at railroading, outside of an office, until they were appointed trainmasters. Another began railroading as stenographer to a division superintendent; was appointed assistant yardmaster, then general yardmaster and finally trainmaster. Still another who is holding down a trainmaster's job was a station agent before his promotion. Now

imagine this galaxy of brainy (?) officials trying to elucidate the rules for the benefit of a company of engineers and conductors who have been up against the grind for twenty years! It is a good deal like having a justice of the peace interpret the law for a supreme court judge.

Not long ago a vacancy occurred in a trainmaster's position and the appointment of a conductor was urged. There was nothing against the man. He had been in the service a good many years and had worked up to a passenger run. That he was qualified to be a trainmaster no one disputed. But the company said they were not making trainmasters out of conductors! No; they will probably give the place to some pencil pusher who is a particular friend of some officer "higher up."

It has often been charged, and not altogether without justification, that too much favoritism is shown in the selection of railroad officers. There is an old saying that "there is plenty of room at the top." That is true in a way, and many men reach the top because they are so energetic and practical that they cannot be kept down. But as a general thing it has been my observation that, in most cases, the top is reached much quicker if you have some fellow up there to give you a helping hand now and then. Promotion in railroad work is not always made on merit. In fact, the opposite is too often true, and it is the fellow who has the most influential friends higher up that gets ahead.

Let us have better roundhouse foremen; but pay them in keeping with the responsibility of their position. Let us have better traveling engineers. Let us have better trainmasters, for God knows we need them; but let us select the right kind of material, conductors or traveling engineers. Make promotions entirely upon merit and fitness for the position. Get away from this favoritism and use some common sense. The railroads, if they ever expect to escape criticism for the annual slaughter of passengers, must wake up to the needs of the hour. If this is not done how can they expect to escape criticism and how will they ever be able to stem the time of anti-railroad legislation?

The foregoing remarks are not intended to reflect on "pen pushers" and clerks. They are an important cog in our great railroad machine, and very few of them are appreciated as they should be. They are generally underpaid and enjoy less privileges than any other class of railroad employees. But you can't take a clerk and make a successful railroad official out of him. That's the point I am trying to make.

M. M.

#### DESIGN OF UNDERFRAME FOR CARS.

CHICAGO, Ill., March 7, 1913.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

Recently in looking over some diagrams of underframing for cars, I was impressed with the fact that the paneling (horizontal plane) was generally quadrangular in form. As the quadrangle will always collapse without altering the length of the members, its strength is limited generally by its corner connections without reference to the individual members. The triangle is the only rigid polygon and a truss is necessarily com-

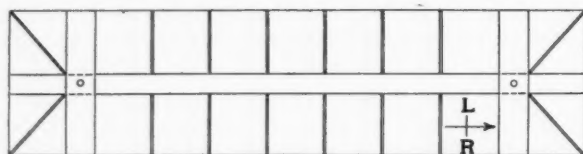


Fig. 1.

posed of triangles. This fundamental principle has been taken into consideration to good advantage in designing car bolsters and sills to resist vertical forces. We have fish bellied girders and truss rods in endless variety.

The horizontal projection, or plan, is generally somewhat like Fig. 1. There are two center and two side sills with bolsters between them. About the only variation found is in the diagonal strut in the end panel. This is sometimes taken out alto-

gether, and sometimes is placed between the other two corners. The pull and thrust is taken care of by the two center sills, unless the end member is stiff enough to transfer part of the load to the sides.

If, for the purpose of this demonstration, we assume that the two center sills carry all of the load, they will be in tension when the car is pulled, and in compression when the car is pushed with a load ahead, or is bumped in switching. When

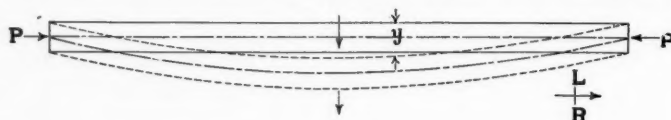


Fig. 2.

the latter happens we have a long column, as shown in Fig. 2. When the car is loaded heavily enough to bend the sill downward, these forces will only add to the deflection in the vertical plane. When the bending takes place in the horizontal plane we will have a bending moment at all points which would be proportioned to the deflection. As this curve would probably be a parabola or a hyperbola it will not be necessary to go into the details at this time. The maximum effect would be pro-

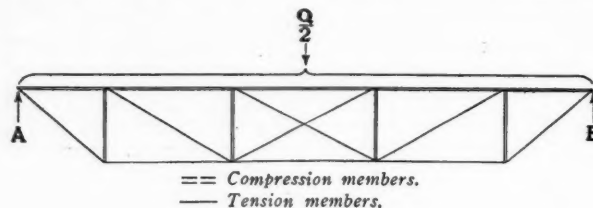


Fig. 3.

duced when this force is concentrated at the center of the column. This force would be a load on the center of the top chord of the right hand truss and on the bottom of the left hand one. If now for purposes of illustration we turn this truss through 90 deg., so that it takes a vertical position, we will have the situation shown in Fig. 3. The style of construction required would be a deck Pratt truss supported at A and B. The number of panels, shown as five, would be increased to seven

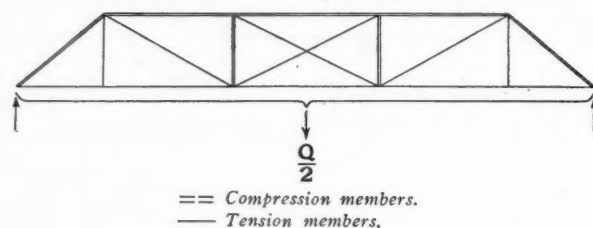


Fig. 4.

for a long car. For the left hand side, the style of framing best suited to carry the load would be a through Pratt truss, as shown in Fig. 4. When the bending is in the opposite direction to that shown, we would have similar diagrams with the diagonals in opposite directions.

When the four diagrams are placed so that those for the left



Fig. 5.

are over each other, and those for the right are similarly placed, we will have the diagram marked Fig. 5. The compression



members are shown where there are both kinds. This all looks simple enough when based on fundamental principles. The form of truss with vertical struts was selected for the reason that they have to carry vertical loads in any case and sections suitable for bending stresses will be suitable for struts in most cases. If we wish to regard the whole system as a column with the loads uniformly distributed at the ends, we would then have a column with the lattice system now in common use for compression members.

When the train is on a curve, the car ahead and the car behind

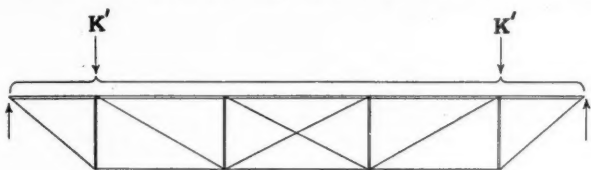


Fig. 6

pull the ends sideways. This brings a lateral thrust on the king bolt of the truck which must be distributed through the floor system. If the speed is greater than that for which the curve is elevated, there will be an outward thrust, which will be applied at the king bolt, but will be in the opposite direction from the preceding. Their algebraic sum will be applied to the floor system, as shown in Figs. 6 and 7. There will be two loads at

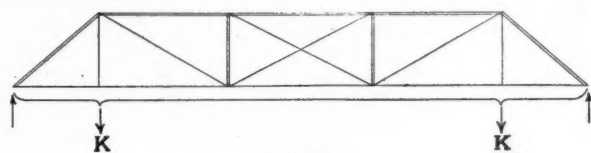


Fig. 7

the panel points, and the same form will be required as in the foregoing. When the speed is less than that for which the curve is elevated, the thrust will add to that of the pull of the train, in front and behind the car in question.

There has been no attempt in the foregoing to take into account the question of elastic distention, etc., but simply to find out if there is any objection to using the truss principle. The truss has been shown to be the most economical for similar forms of construction, and it seems odd that competent designers have not gone into the matter. If they have, I have not been fortunate enough to find their ideas in print, and so cannot tell what have been the objections to the truss in times past. If the material now used is necessary to withstand the lateral stresses, it would appear that a lesser amount can be used to accomplish the same purpose, by making a careful analysis and a scientific design.

PAUL M. LA BACH,

Assistant Engineer, Chicago, Rock Island & Pacific.

#### THE CONDUCTOR'S AUTHORITY AND RESPONSIBILITY.

SAN FRANCISCO, Cal., March 25, 1913.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The letter in your issue of March 7, entitled, "The Captain of a Freight Train Crew," is interesting and logical. I do not think, however, the writer gave full expression to the points he had in mind. Particularly, it appears to me the conductor's judgment of and authority over his men is not accorded the rating it deserves, considering his responsibilities, and assuming that he is, fundamentally, a man of good judgment.

He does not have authority to employ or discharge, and when on the road or in a yard with a man who proves indifferent or incompetent the only remedy he may adopt is to relieve the man of responsibility, and reapportion the work; perhaps assume some of the duties himself, and report by wire or in person. Often, however, conditions oblige him to work the man into terminal or to the end of the shift, after which the latter may be superficially questioned by an officer, and, perhaps, with mere reprimand or warning, continued on the run, or assigned to another. Although an inexperienced man may be sent out as a

student two or three trips and be approved by the conductor under whom he works, the conductor's judgment of him cannot be other than superficial, as the traits of men cannot be fully studied in so short a time. Aside from this, if the man is accepted after trial he may be assigned to a conductor other than the one with whom he was tried and who, therefore, to some extent is expected to abide by the judgment of others. Brakemen and switchmen are often assigned to work with a conductor with whom they are neither psychologically or mentally fitted to join in responsibilities.

In the army a captain does not recruit his men, ordinarily, but he does have practically unlimited authority over them during engagements on the field; and in times of stress, if he is beyond the range of superior authority, conditions may justify him in exercising the power of life and death; subject to review, of course, by his superiors at any time. From the standpoint of averting disaster the responsibilities of the conductor are as great in their way as are those of the captain. The duties of a train crew are varied and many during the day or trip, while the units of a military organization are, generally, only expected to act in unison in a given action or direction.

Brakemen and switchmen at times are indifferent to duty because of lack of full respect for the orders or judgment of the conductor, knowing the limits of his authority and also knowing that the conductor is invariably involved in the results of failures of his men; and indifference is often the primary cause of accident or disaster. The conductor often handles switches, makes couplings, gages clearances, etc., merely because he realizes his ultimate responsibility, and therefore partially undertakes the duties of his men, fearing to fully trust them under complex or hazardous conditions. Individual instances have occurred where men have damaged equipment or track, or hazarded lives, after the conductor had properly cautioned them to be alert as regards the position of switches, watching clearances, etc. Often, I think, conductors are jointly disciplined with their men when it is not morally just to do so.

Trainmen or switchmen are employed by officers or their office representatives, and the conductors, individually and as a body, can exercise no judgment until on the road or in the yard with the men, and then their estimate, generally practical and fair, can be emphasized by emphatic action if necessary, but only through action by an officer whose judgment, fundamentally, may not be as sound as that of the conductor. Surely, this is no reflection when we recall that many conductors have been appointed to office and have proved themselves efficient.

Would it not be well if conductors were allowed some degree of joint participation in the selection and discipline of men who are to assume responsibilities under their direction? Undoubtedly, it is difficult to determine equitable and practical measures for governing their authority. Nevertheless, this feature is one of the most important and far reaching in the conduct of transportation, and deserves keen study by officers from practical and psychological viewpoints. Generally, the practical phase is given more study than the psychological, although the latter should be regarded equally important with the former.

EDWIN SWERGAL.

#### EFFICIENCY OF FREIGHT HOUSE FORCES; DAMAGED FREIGHT.

KANSAS CITY, March 10, 1913.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

Within the past two or three years practically every railway of importance in this country has inaugurated a campaign to reduce its loss and damage account. While the details may vary somewhat on the different lines, the general principle involved is one of education and instruction among all classes of employees who have to do with the handling of freight, in order that they may better appreciate the causes contributing to loss and damage and thus be in a position to prevent it.

The result, as is frequently the case with reforms of this na-

ture, is for a time extremely gratifying; but after a year or two it is apparent upon analysis that while a substantial improvement has been effected along certain lines, the showing in other directions is very unsatisfactory; and it is felt that the progress made has not been commensurate with the efforts put forth by those who were directing the campaign. Much effective work has been done to better the physical condition of freight cars, to induce shippers to improve the character of their packages and to supervise the handling given freight by train and yard crews; but the most prolific source of loss and damage, in the case of less than carload freight, is the improper handling it receives at freight stations, and the result of the campaign so far as it relates to this feature is in many respects discouraging.

This is due to a variety of causes, but the chief one of them is that we have been unable to develop in certain classes of employees a feeling of personal responsibility for their work. It is only by instilling this into the minds of our employees who handle freight that we can ever hope to bring about the results we are after. This attitude of the employee toward his work may be developed by appealing to his self-interest, or by fear of discipline or loss of position; but, regardless of how it is accomplished, he must have it, if there is to be efficient service obtained from him.

It is apparent to any one who has studied the results of such a campaign as I have mentioned that the employees who have gained the most and whose services have correspondingly improved, have been the ones who had the most to lose and who were therefore the most susceptible to discipline. Unfortunately, however, in the case of station service the handling of the freight is delegated to subordinates, who are hard to reach, and who cause the most trouble.

Our over, short and damage statistics show that from 60 to 70 per cent. of the errors made which result in either loss or damage occur at the transfer stations. I mean by this the district or division terminals where merchandise cars are worked and where platform forces are maintained; and it is at such places that our efforts to improve the service meet with the most discouraging results, because of the changes that are continually taking place among the men and the impossibility of developing and maintaining anything like a satisfactory organization.

These changes are brought about by fluctuations in labor conditions along the line. When farmers or manufacturing industries are in need of men they are in a position to offer better wages than the railroad company, whose scale is far less elastic; and the railroad gets what is left. We are continually breaking in new men in the freight houses whose only idea is to hold the job until something better turns up. In the struggle to keep pace with the demands of a few well organized classes of employees and still operate their roads at a profit, executives have been slow to meet the need for better pay among the great body of unorganized employees; and with the granting of each succeeding demand to the former, the prospects of the latter appear to become more and more remote. The result is that men of fair intelligence and capability who were willing to work formerly for the wages paid station help have forsaken this field for employment that offers better pay and in most cases shorter hours; so that, generally speaking, we are no longer able to secure the same class of help in our freight houses that we did a few years ago.

The wages paid freight-house help at the present time approximate those paid track repairers, and if the railroads of this country are finding it hard to secure good foremen for their sections it is not surprising that they are experiencing similar difficulty in keeping up the standard of their freight-house foremen and check clerks; and when the burden of responsibility for the correct and careful receiving, inspecting, checking, handling and stowing of freight, together with the interpretation and application of numberless rules and regulations pertaining to special commodities, is placed upon these men, it is not difficult to see why we continue to have the same loss and damage troubles year after year. The agent who is face to face with

the problem of trying to build up an efficient freight-house organization out of this material is frequently placed in the position of being obliged to retain men whom he knows to be careless and incompetent, through sheer inability to get new men in case he should discharge the present force.

The position of freight-house foreman is one of no little importance. To my mind it demands an equal amount of intelligence and responsibility with that of chief clerk or cashier; and yet we pick up foremen without any regard to their qualifications and pay them lower wages than the average unskilled laborer commands in the same community and then expect them to possess the executive ability necessary to keep things running smoothly on the freight platform. The wonder is that we succeed as well as we do. We pay good salaries to our cashiers and revising clerks so as to secure men who are honest and competent in order that our revenue may be protected, but we turn the job of checking valuable merchandise over to a laborer at a dollar forty a day. Where the incompetent revising clerk may lose a couple of dollars of revenue the incompetent check clerk is more likely to cost us a couple of hundred dollars by delivering a box of household goods with the wrong shipment, or receipting for something he did not get. I believe it is just as vital, if not more so, for us to have honest, competent and reliable freight-house foremen, check clerks and stowmen, as it is to have these same qualities in our chief clerks and cashiers; and the only way I know of to secure and retain such men is to pay them salaries that are somewhere in proportion to the qualifications we expect them to have.

The objection has been raised that to make a general increase in the pay of all station help would mean such an enormous sum in the aggregate that it would be impracticable, and also that in the event that this was done the railroads would still be competing with industries along their lines for the labor of substantially the same individuals at higher wages but with no corresponding improvement in the character of the services obtained. This would doubtless be true if such a horizontal increase were made, but, in my opinion, such a step is by no means necessary to accomplish the desired result. I believe that by judiciously expending a comparatively small percentage of the amount we are now paying out annually in loss and damage claims, we could increase the salaries of foremen, check clerks and stowmen at the more important stations, where most of the errors are now being made, to a point where they would attract into these positions a better class of young men who would not only take an intelligent interest in their work and fill these places efficiently, but would also be capable of being advanced to more responsible posts.

Anyone who has handled O. S. & D. investigations must realize what a tremendous reduction could be made in loss and damage if it were possible to make the man who handles the freight take the same interest in its welfare that he would if the goods belonged to himself; and while perhaps it is not within human nature to attain this degree of perfection, much can be accomplished through appeal to a man's self interest by making his job mean something to him and then holding him strictly responsible for results.

The question of truckers under this scheme becomes a simple one. By taking from them all responsibility except that of pushing a truck we are then getting just what we had a right to expect when we hired them—common unskilled labor—and when we expect anything more from this class of help we are simply deluding ourselves. Truckers can come and go, but if we have competent foremen, checkers and stowmen who are interested in their work and who are held strictly to account for all errors that are made, the changes among the truckers will not affect the efficiency of the freight-house force in the least, and we shall then be able to accomplish results through the placing of individual responsibility in connection with an effective system of discipline that will go a long ways toward eliminating what I believe is at present by far the largest contributing cause of our loss and damage payments.

K. J.

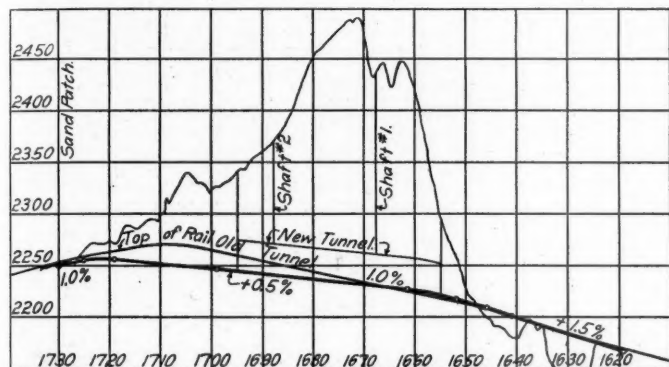


## THE SAND PATCH TUNNEL IMPROVEMENTS.

**Additional Facilities Just Completed by the Baltimore & Ohio in Crossing the Summit of the Allegheny Mountains.**

The Baltimore & Ohio has just completed the construction of a 4,000 ft. double track tunnel alongside its present single track bore at Sand Patch, Somerset County, Pa., on the Connellsville division. This is an interesting piece of heavy railroad tunnel construction and rock excavation which was complicated by two unusual and disastrous slides, involving 200,000 cu. yds. of solid rock, and the resulting cave-in and tie-up of the existing tunnel, adjacent to the new work.

Sand Patch is located on the main line of the Baltimore & Ohio, from Cumberland, Md., via Pittsburgh to Chicago, at the summit of the Allegheny mountains, at elevation 2,273. It is 23 miles west of Cumberland and 117 miles east of Pittsburgh. The situation at this summit was an especially difficult one from an



### Profiles of New and Old Tunnels.

operating standpoint, owing not only to the long and heavy approach grades of 1.5 per cent. from the east and 1 per cent. from the west, but more particularly to the old Sand Patch tunnel, located on the steep east approach, which in addition to being on a 1.0 per cent. grade, is only built for single track, restricting the running track facilities of the division from double track.

The old tunnel is 4,777 ft. long, on a tangent, and is located with its west portal 700 ft. east of the actual summit. It was completed in 1871, after an interrupted period of construction of 17 years, during eight years of which work was actually under way. Although constructed for single track, provision was made

freight and 35 tonnage freight—as well as numerous switching and pusher movements. This heavy traffic had resulted in considerable congestion, with the incidental delays to trains and train crew over-time. Indeed, so congested had the traffic been that at times for an entire day the tunnel was used to its maximum capacity.

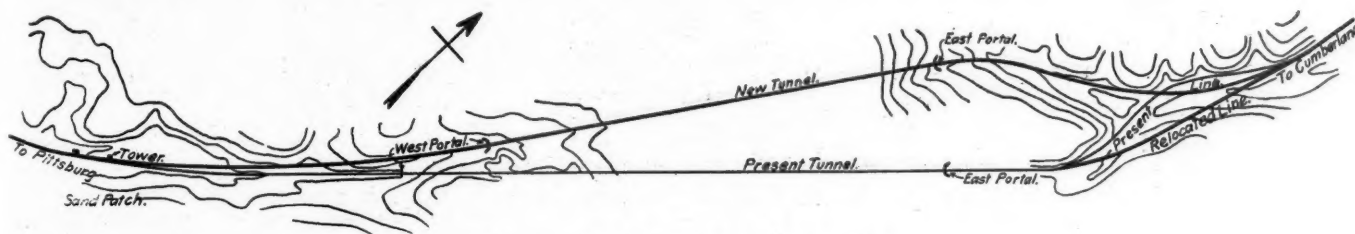
In the face of these conditions—the adverse grades, the single track, poorly lined and poorly ventilated tunnel, and the magnitude and nature of the traffic—the operating difficulties were obvious. They had their most pronounced effect on tonnage freights, which require two pushers both east and west bound. One of the westbound pushers was forced to cut off at the east end on account of the sulphur fumes in tunnel, while the other had to work up the grade through the tunnel using forced draft for the entire length. Both eastbound pushers cut off at the summit at the west end. Aside from the congestion and the resulting costly operation, there was the element of inconvenience in operating through the tunnel due to scant clearance and poor ventilation. Added to this, trainmen have been overcome by the gases, so that, in short, the old tunnel presented a most disagreeable and burdensome feature from every aspect.

PROPOSED LAYOUT. .

Studies and investigations to improve these conditions have been carried on for the last ten years, covering a variety of propositions, including a long low-grade cut-off line, and a low-grade line involving a three-mile tunnel. They culminated in the spring of 1911, in the adoption of a plan providing for the construction of a new double-track line 11,000 ft. long, on the north side of the present tracks.

The proposed new line and its relation to the present one is shown in the plan and profile. It will be noted that the new line involves the construction of a 4,000 ft. tunnel just north of, and making an acute angle with, the present line; an east approach cut of 75,000 cu. yds., and a west approach cut of 425,000 cu. yds. The scheme also provides for a revised alignment of the old line east of the tunnel for 2,600 ft., and on the west for a 200-car capacity set-out yard with wye connections for eastbound tonnage trains.

According to the original figures the quantities involved were 130,000 cu. yds. of rock excavation in tunnel; 500,000 cu. yds.



### Alinement of New and Old Tunnels.

wherever permanent stone lining was installed, for a future second track, the arch being placed on a bench at the springing line. Dry ashlar masonry was used for lining; this was, however, used only in a relatively few places, where the original builders thought necessary. Owing to the treacherous character of the rock it has since been necessary to timber all the unlined parts, except one section of 100 ft. and to under-timber the stone lined portion as well, thus reducing the overhead clearance to 16 ft. above the rail. Four shafts were built at irregular intervals along the old tunnel; of these one is closed, and the other three provide the only means of artificial ventilation.

The train movements through this tunnel were very numerous, comprising an average of 57 trains per day—16 passenger, 8 fast

of rock excavation in cuts, and 27,000 cu. yds. of concrete in tunnel lining and culverts. The item of rock excavation in cuts was, however, increased to 700,000 cu. yds. through two successive landslides in the west approach cut, which will be described later.

The maximum grade on the new line is 1.5 per cent. on the east approach to the new tunnel; the same as the existing maximum grade. Through the new tunnel, however, the grade is 0.5 per cent., the ruling road engine grade on the division which will eliminate all pusher service through the tunnel. Because of its short length, the new line will not permit of an increase in the loading of tonnage trains on the division; in fact, the line was not designed, even as a connecting link, to



View of Slide of July 9 from Above West Portal.



View of Slide on August 15, Showing Shaft in Center Above Old Tunnel.



afford permanent relief from the adverse grades in this territory; but, its purpose is primarily to relieve the congested and restricted conditions through the old tunnel.

Outside the limits of the improvement the operating methods on the division will remain practically unchanged, except as to the return trips of the pushers and the loading of eastbound trains. Within the changed district, the contemplated scheme of operation proposes the use of the two new tunnel tracks for westbound traffic only. The old tunnel, after being enlarged and re-lined, is to be used for all eastbound trains, its grades in this direction being favorable to the traffic.

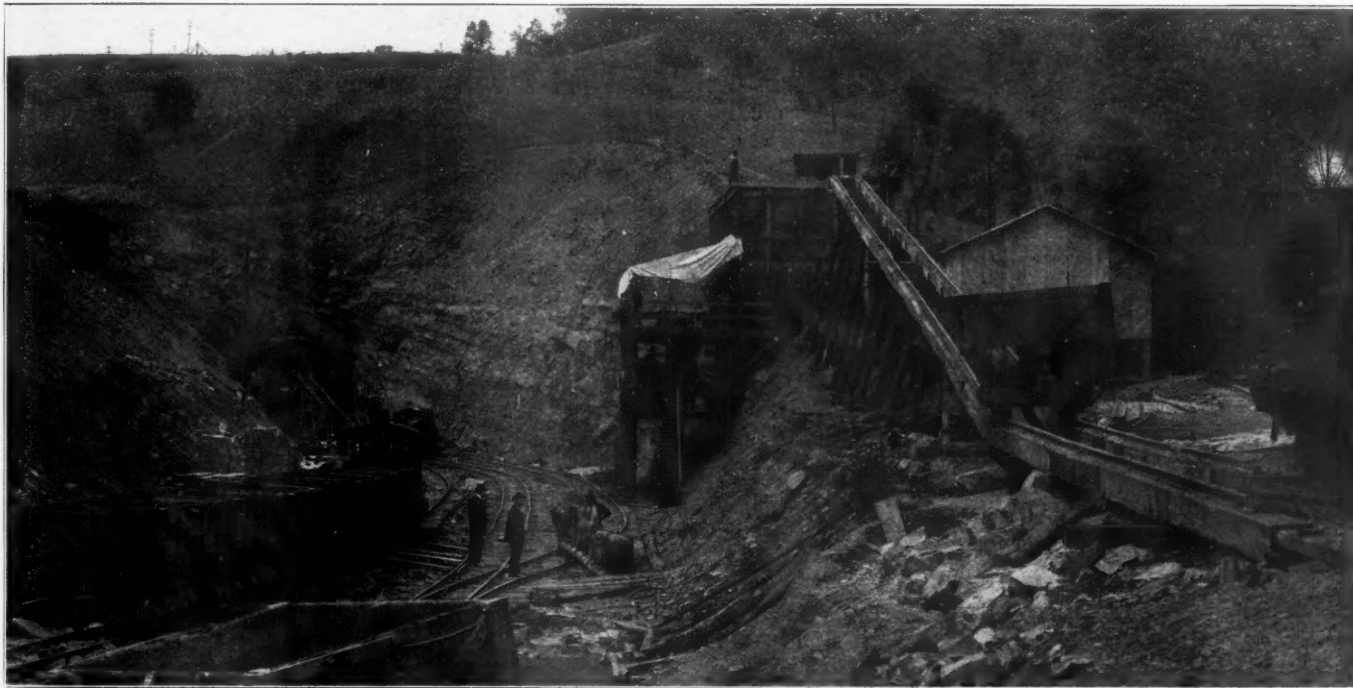
East and westbound trains will have their tonnage increased somewhat by the use of heavier pushers. Eastbound pushers will cut off at the west end and lighten the trains for safe operation down the long and steep east slope, placing the surplus cars on the eastbound set-out tracks previously mentioned. Westbound pushers will cut off at the east end of the tunnel. When necessary they will bring along extra crews, run light to the west end, pick up the cars on the set out tracks and haul them eastward. Otherwise westbound pushers will back up as

shale prevailed. The loose earth made it necessary to timber the shaft for a depth of 25 ft.; below this point timbering was not resorted to, because of the solidity of the rock formation. The timbering consisted of horizontal 10 in. x 10 in. walers placed six ft. center to center; 2 in. x 6 in. lagging, and two intermediate 10 in. x 10 in. struts spaced equally; dividing the shaft into three compartments. While the shafts were provided primarily to expedite the excavation of the tunnel, it is the purpose to use them for ventilation as well. To make them permanently suitable for this, it is proposed to line them throughout with concrete, and carry them above ground level.

#### HEADINGS.

From the foot of each shaft, headings 9 ft. x 16 ft. in size were immediately started in both directions. The two from the east shaft, driven as top headings, were placed so that their base was at the elevation of the wall plate, the roof being nearly at the elevation of the future roof of the completed tunnel.

From the west shaft the procedure was somewhat different. The west heading was driven as a bottom heading, the floor



General View of Concrete Mixing Plant at East Portal.

heretofore. In this manner the actual pusher mileage will be somewhat reduced, a considerable light return pusher mileage will be eliminated, and above all, a very large amount of overtime of all engine crews will be saved by the facilitated operation.

#### VERTICAL SHAFTS.

In the spring of 1911 the contract for the work was let, and about May 1 the work was actively begun. One steam shovel outfit with drills, etc., was placed in the east approach cut. While the approach excavation to the tunnel portals was in progress, two vertical shafts, 12 ft. x 22 ft. in size, No. 1, 200 ft. deep and No. 2, 133 ft. deep, were sunk transversely at points 1,300 and 3,300 ft. from the east portal. As little water was encountered, they presented no unusual features. Table 1 shows the rate of progress attained in sinking these shafts.

TABLE 1.

Shaft.	Depth.	Yardage.	Period of construction.	Lineal feet of progress per day.	Yardage removed per day.
No. 1. East	200 ft.	2,904	68 days	2.96	43
No. 2. West	133 ft.	1,931	52 days	2.56	37

At both shafts a layer of loose earth and soil about 14 ft. in depth was found, from which point to the bottom red sandstone

being on the proposed sub-grade line of the completed tunnel; the east heading from this shaft was started in the same way. This was somewhat in the nature of an experiment for this class of rock, the contractor's idea being that the subsequent excavation work within tunnel sections would be more easily performed by blasting the material from above and dropping it down into the heading and then loading, by which method he was counting on no timber. After the west shaft headings had been driven a distance of 700 ft. it was found that this bottom heading plan was inadvisable, as the rock was not self-supporting and required timbering throughout. The east heading was then continued on an upward grade of 5 per cent. until its base was at the wall plate grade, when it was driven in the same manner as the east shaft headings. The west heading from the west shaft was redriven as a top heading.

By the middle of August, 1911, the excavation of the east approach cut was sufficiently low to permit the driving of a top heading toward the east shaft, which made the fifth heading to be worked, shown in Table 2 as No. 1 heading, east portal.

The excavation of the material in the first headings was carried on by the usual method of column drilling and shooting; the muck was loaded by hand into narrow gage 2-yd. end dump

Oliver cars, hauled to the shafts by mules, elevated to the surface, and wasted on the sides of the mountain. The progress made in this work is briefly given in the following table.

TABLE 2.

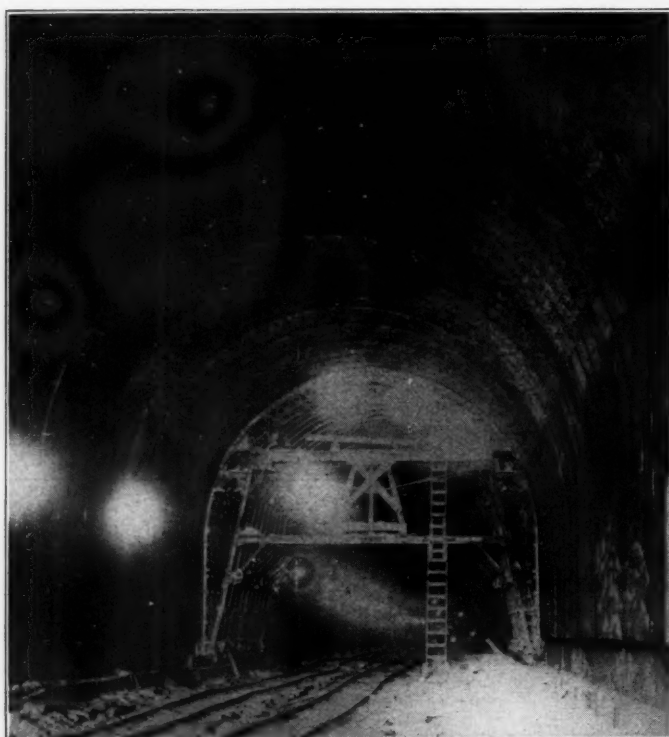
Heading from	Length in lin. ft.	Yardage.	Days worked 2 shifts.	Average daily progress.	
				Lin. ft.	Yardage.
No. 1, East portal .....	700	3,743	75	9.33	49.92
No. 2, Shaft No. 1—East. 594		3,100	81	7.33	38.27
No. 3, Shaft No. 1—West. 979		5,200	113.5	8.63	45.81
No. 4, Shaft No. 2—East. 1,009		5,800	132.5	7.62	43.77
No. 5, Shaft No. 2—West. 694		4,000	106.5	6.52	37.56

The second heading, embracing the enlargement to complete tunnel section of the walls and roof of the first heading, followed closely after the first. The material was handled as that from the first heading.

## TIMBER.

The material penetrated by the tunnel is red sand stone shale, the strata of which dips northward rather uniformly at an angle of from 15 deg. to 20 deg. with the horizon and almost directly toward the new tunnel center line. In many places the rock is very solid and stable; in others it is rendered treacherous by transverse and almost vertical seams normal to the dipping plane and approximately parallel with the new tunnel center line.

Under these conditions, and after the change from the bottom to the top heading plan, the contractor decided to timber the tunnel throughout. This proceeded as rapidly as the widening out of the second heading permitted, the average weekly progress being 40 lin. ft. The timberings were spaced on 5-ft. centers and consisted of seven segments of 12 in. x 12 in. timbers sup-



Inside of New Tunnel Showing Brick Facing Over Crown of Arch.

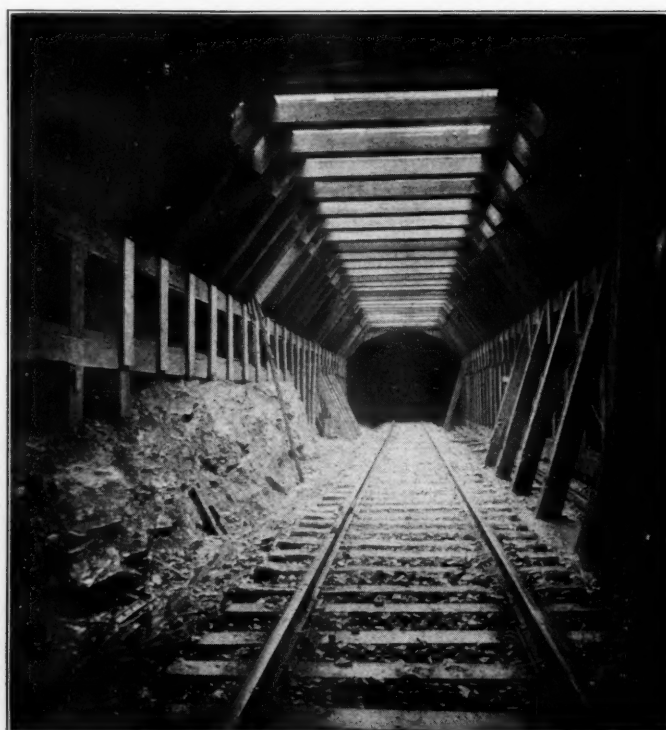
ported on a 12 in. x 12 in. wall plate. Two inch lagging was placed over the timbers, and the space above this to the limits of the excavation was carefully dry-packed.

## BENCH.

The bench was broken by simultaneously shooting four vertical holes 17 ft. deep spaced 10 ft. apart, drilled in transverse rows on 14 ft. centers. The outer holes were kept 3 ft. from the wall plate. This spacing, except in several instances, broke the rock practically to complete rock excavation lines without injuring the wall plate. From the east portal to shaft No. 2, a distance of 2,700 ft., this loosened material was loaded from March 1 to

June 1, 1912, into narrow gage dump cars by an air-operated Model 40 Marion shovel, which was replaced June 1 by a Model 60 Marion shovel with a special short boom. The cars were hauled to and from the east dump in trains of ten, by 18 ton Porter dinkeys. The dump cars were snatched singly to and from the working face at the shovel by an air hoist and cable. Siding facilities on the dinkey track enabled the switching of these single cars from an empty to a loaded track.

It was originally intended to work a second Model 60 shovel from the west portal eastwardly, but the work in the west approach cut was delayed to such an extent that this proved impracticable. In August, 1912, a Model 40 Marion shovel was brought in dismantled from the west portal through the enlarged



Old Tunnel After Removal of Cave In.

heading, erected at shaft No. 2, and started toward the west portal loading the bench, to expedite this work. The material loaded by this shovel was hauled to shaft No. 2, elevated to the surface and wasted on the mountain side.

The following statement gives the average progress made by each of these shovels, the time worked and the yardage removed.

TABLE 3.

Shovel.	Number of shifts worked (10 hours).	Average progress per shift.		Maximum progress one shift.	
		Lin. ft.	Yardage.	Lin. ft.	Yardage.
Model 40.....	107	9.5	109	14	280 cu. yds.
Model 60.....	220	11.0	220	21	420 cu. yds.
*Model 40.....	43	14.0	168	20	240 cu. yds.

\*Note: Yardage per foot of Model 40 shovel was reduced on account of bottom heading, 40 per cent. of the material being previously removed.

The figures are not comparative, not only because of the different powered shovels, but because of the different methods employed by each in transporting the muck to the dump. Attention is, however, called to the good, general average attained by the Model 60 shovel, which is considerably higher than the usual, and believed to be a record for this class of work.

A trimming gang followed closely after the shovel. It trimmed the falls to proper section where necessary with jap drills, and reinforced the wall plate by plumb posts wherever it was loosened by the shovel operations.

## TUNNEL LINING AND PORTALS.

After considering the various advantages and disadvantages of the common types of lining, all brick, all concrete, and con-



crete side-walls with brick arch, a somewhat novel design was adopted. It called for a monolithic concrete structure throughout, with a single row of brick inlaid in the arch between the 25 deg. lines, as shown in an accompanying photograph. Each fourth row of brick are laid as headers, to more thoroughly bind the brick to the concrete.

It is considered that this design provides the economy and other advantages due to a monolithic and completely filled structure of concrete over brick, and at the same time eliminates the objection against the former, in that the row of brick will prevent the otherwise rapid disintegration of the concrete from the locomotive gases and blast. Attention is called to the fact that provision is made for a concrete ditch on one side, for two 4-way



The Completed East Portal.

ducts for electric power and telegraph lines, for cable boxes for electrical apparatus, and for the usual refuge niches. In the design of the portals, a massive structure, and one not lacking in architectural treatment, was sought.

#### CONCRETE PLANT.

To handle, mix and place the materials embraced by the 27,000 cu. yds. of concrete in the tunnel lining required an extensive concrete plant. This it was decided to concentrate at the east end, because of the advanced stage at which the work at that point was maintained. The plant as built along the standard gage delivery tracks on the north side of the east approach cut is shown in one of the photographs. It embraces essentially a set of sand, stone and gravel storage bins, a hoist and cable with elevating trestle for hauling this material to supply bins over the mixing platform and two steam-driven one yard Smith mixers, with the usual provision for cement storage and water supply.

The three storage bins are located about 700 ft. east of the mixing plant, at the foot of the 1:1 slope from the delivery track. Their floor level is from 12 to 16 ft. below rail. They are of wood, having a capacity of approximately 1,500 cu. yds. each, and are supported by posts over a narrow gage track by which the materials are hauled to the mixer, hopper doors in the floor being provided to load the cars. The material coming in standard gage cars is cast down a slope by hand into the binds or placed by a locomotive crane. This method was made necessary by the lack of vertical headroom at any convenient site.

From these storage bins the material was hauled in single 4-yard ordinary dump cars up an incline to the mixer, by cable and steam hoist, where it was dumped into the supply bins, each of which had a capacity of 110 cu. yds. From the supply bins

the aggregates were delivered by gravity chutes to the hoppers above the two mixers. The bins were so arranged—the middle one holding sand—that one mixer furnished gravel concrete and the other stone concrete. The cement was wheeled to the hoppers from the adjacent cement house located along the delivery siding on the same level with the mixing platform, while the water was drawn from a 3,000 gal. tank above the bins, to which it was pumped from a nearby stream.

The concrete specified was gravel or stone to the springing line, and stone in the arch. In either case the mixture required was 1:3:5.

#### FORMS.

Blow collapsible steel forms were used, which were mounted on wheels running on a rail laid on top of footings previously constructed. The working platform and dumping aprons were placed at the brick line 16 ft. above sub-grade, which permitted of a rapid and efficient method of handling and placing the concrete. A wooden frame incline approach on a 13 per cent. grade, mounted on narrow gage trucks, provided means of elevating concrete materials to the working platform.

The concrete was hauled from the mixer to the foot of the incline in steel Koppel dump cars by Porter dinkey engines; here the cars were cut loose and were hauled up the incline onto the working platform by an air hoist and cable, where they were dumped. In the side walls up to the end of the steel lagging at the brick line, the concrete was passed down the sloping aprons by hand. Between the limits of the brick lines wooden lagging was used on the forms and placed as the work progressed. The brick and concrete work was carried up simultaneously, the brick being placed in one bay, while concrete was



Big Slide at West Portal.

being placed in another. In this manner, the arch was built up from both sides until a 5 ft. key remained to be put in at the crown. This key was placed longitudinally from one end of the form to the other on transverse lagging cut to fit the 5 ft. opening, the lagging being inserted progressively as the arch was sealed.

Three sets of these forms in units 40 ft. long and one incline were installed in June, 1912, and the concreting was begun by July 1. The program by which it was carried out was as follows: Starting with all three forms in place with the incline at form No. 1, the sidewalls and arch were finished at this form in about 3½ shifts; the incline and hoist were quickly moved to form No. 2; where the concreting was immediately begun and

completed in the same time, No. 1 form being allowed to set; upon finishing at form No. 2 the incline and hoist were moved ahead to form No. 3 and concreting begun there. While this was going on, Form No. 1 was moved ahead and again worked upon the completion of No. 3. In this manner work was carried on continuously, and each arch was given 48 hours in which to set.

On October 1, 1912, a fourth set of forms and two additional inclines were installed to hurry the completion of the work. Up until that time 2,000 ft. of finished lining had been placed with the three forms, an average daily progress with two shifts of 21 ft. having been attained. With the four sets of forms working, this average daily progress was increased to 40 ft.

For the sake of economy in excavation, the north side of the west approach cut was planned on a slope of  $\frac{1}{8}:1$ , this being specially favorable from the fact that the strata dips into the hill on that side. The depth of the cut and the broken nature of the rock made a solid face for this slope very essential. Accordingly, the steam shovel excavation was kept about 8 ft. from the final face of the cut, and this 8 ft. ledge was removed by a Sullivan channeling machine and two sets of quarry bars, holes being driven on 9 in. centers. These were set up along a bench and put to work at the final slope line. As only light charges of dynamite were required to loosen this intervening ledge, the rock wall was disturbed very little.

#### SLIDES IN WEST APPROACH CUT AND CAVE-IN OF OLD TUNNEL.

For a distance of 800 ft. west of the new west portal the new cut, 90 ft. deep on the center line, is separated from the old tunnel by a ledge of rock tapering in width from 185 ft. at the east end to 75 ft. at the west end. This proximity of the old tunnel, combined with the stratification of the rock in this ledge, which dipped at an angle of from 15 to 20 deg. from the old tunnel directly toward the new cut, produced a situation which was, of course, the subject of much thought and speculation. Accordingly, great precautions were taken in regulating the blasting and other work in this district to avoid any possible interference with traffic through the old tunnel.

It was originally proposed to take out the south side of this cut on a  $\frac{1}{2}:1$  slope up to the earth line, then provide a 15 ft. berm and continue on a  $1\frac{1}{2}:1$  slope. On this basis the cut had been excavated to within 20 ft. of the proposed sub-grade, when, on March 15, 1912, 80,000 cu. yds. of rock broke away and slid into the cut, burying one steam shovel. The break took place along a seam inclined slightly from the vertical into the hill, and left a projecting face whose maximum depth was 28 ft. The break extends over a distance of about 350 ft., and filled the new cut to a maximum depth of 30 ft. The seam occurred north of the old tunnel, fortunately leaving it intact.

By the end of June, the fall of material had been excavated and the cut practically restored to its former level, the south side having been flattened to a  $1\frac{1}{4}:1$  slope. On July 6 a new movement of the south slope was detected, this time extending east 600 ft. from a point directly over the old portal. New openings continued to appear up into the hill, the extreme breakage being 50 ft. beyond the old tunnel. At the same time some of the arch stones in the old portal showed signs of strain and at noon of July 9, a spall broke off just at the south springing line.

In the face of these conditions, the shovels in the danger zone were pulled back and a very thorough watch was maintained. At 6.05 p. m. of July 9, three days after the first cracks appeared, the hillside gave way, and in sliding cut a void in the old tunnel roof, completely filling the old tunnel for a distance of 71 ft. and again partly filling up the west approach cut. The west end of the break within the tunnel occurred about 180 ft. east of the west portal, the intervening portion remaining solid—a very peculiar result, as the breaks indicated trouble would come just where it did not.

Arrangements were immediately made to divert all traffic over the newly completed line of the Western Maryland between Sand Patch, Pa., and Cumberland, Md., a distance of 32 miles. At the same time, it was at once apparent that the only safe and

certain method of reopening the old tunnel involved the removal of as much of the overlying hillside as had any effect on the moving portion—a matter of months rather than days.

Accordingly, it was immediately arranged to install all the necessary plant and men. In less than 24 hours, 1,000 men were working continuously, grading and laying a standard gage track up the hill, constructing several narrow gage tracks to nearby dumping grounds, and installing all the available plant. In another day a Model 60 Marion shovel started digging on the side hill, while the following day saw two more Model 60 shovels at work on the overlying material. Thereafter, as rapidly as they could be assembled and shipped, additional steam shovel plants were installed until by July 28 there were three Model 60, one Model 75, one Model 120, one Model 70 and two Model 20 shovels. The five first mentioned were put to work digging away the hillside, the sixth was started casting in the new cut below, because of no available loading track at that point, and the two 20's were held in readiness to enter the tunnel and load the fallen debris.

The plan for reopening the old tunnel that was adopted called for the removal of all material overlying a bench 16 ft. above



View Showing Steel Forms at East Portal and Incline for Bringing in Concrete.

the crown of the old tunnel arch, and the subsequent sinking of a shaft from this bench to the tunnel sub-grade to excavate the fallen material. By August 10, 75,000 cu. yds. of solid rock had been removed and enough of the bench exposed to start the shaft over the cave-in. This shaft was made 110 ft. long and 30 ft. broad. Two stiff-leg derricks with hoists, rigged up 75 ft. apart on the north side, handled the material, loaded by hand into scale boxes, from the pit to dump cars on an adjoining track. In ten days this shaft had been excavated and timbered to the crown of the old tunnel arch, and daylight was let in at both ends of the break. At this juncture the two light model 20 shovels were put in the old tunnel—one at each end—and started loading the fallen debris, hand loading being continued as well where there was no interference.

The ensuing week saw the tunnel cleared of all fallen material, additional timbering put in, and the track relaid and resurfaced, so that at noon, on August 29—after a tie-up of 50 days—the old tunnel was reopened for traffic.

During the construction of the shaft and after its completion, the excavation of the side-hill was continued until the bench



previously mentioned extended from the west portal eastwardly about 300 ft. beyond the east end of the break. It was carried south into the hill for about 50 ft. to prevent any possible future trouble from that slope, which was finished on a 2:1 basis. The limited working area caused considerable interference with the five shovels, but in spite of this, and some extremely poor weather, 120,000 cu. yds. of rock, most of which had to be shot, had been removed by the time the tunnel was opened. As a result of these slides, and to prevent similar trouble in the east end of the west approach cut, the new tunnel has been extended 200 ft. westwardly from the originally planned west portal, building the tunnel arch in the cut and backfilling over it.

#### CONTRACTOR'S POWER PLANT.

The contractor's power plant, central supply house and main machine shop was located at the west end of the west approach cut, where convenient access through a delivery siding could be had from the adjacent main line of the Baltimore & Ohio. The boiler house embraced four 100 h. p. Ames locomotive type boilers by which steam was supplied to the compressors and electric generator. The compressed air for the drills, hoists and shovels in the tunnel was furnished by two straight line, two stage Ingersoll-Rand compressors, which supplied 1,750 cu. ft. of free air per minute, at a pressure of 120 lbs. per sq. in. at the power house. The air line consisted of two lines of 6 in. wrought iron pipe, and extended over the mountains to the east end, a total distance of 6,000 ft.

The electric generator supplied current to the contractor's line at 550 volts, which was stepped down by a transformer on top of the mountain to 220 volts, in which shape it was used in the tunnel for lighting purposes, clusters of five lights in series being employed.

The work was planned and constructed under the supervision of Francis Lee Stuart, chief engineer of the Baltimore & Ohio, and was in charge of Paul Didier, principal assistant engineer. Its execution was under the direct supervision of A. D. P. Janney, resident engineer on the ground. H. S. Kerbaugh, Inc., of Philadelphia and New York, was the general contractor, with R. C. Hunt and A. H. MacLennan construction superintendents.

### A FULL CREW LAW IN NEW YORK.

The legislature of New York passed last week, by large majorities, a bill to require three brakemen on all freight trains of 25 cars or more; and as regards both passenger trains and freight, the bill specifically mentions firemen; so that on the multiple-unit electric trains of the New York Central and the Long Island roads, an extra man will have to be employed as "fireman," although no fireman is needed on such trains. Governor Sulzer gave a hearing on the bill at Albany on Saturday last, and the presidents of the principal roads of the state appeared before him and presented arguments in detail against the passage of the bill; but he signed it nevertheless.

The arguments presented by the presidents had been summarized in a letter to the governor, which they had published as an advertisement in the principal newspapers on Saturday morning. This letter was in substance the same as that which Mr. Rea and other presidents had sent to the governor a week before, and which was reported in the *Railway Age Gazette* of March 21, page 685. The appeal to the public was displayed in the principal newspapers to the extent of a half page in each. It was signed by the presidents of the Pennsylvania Railroad, the New York Central, the New York, New Haven & Hartford, the Delaware, Lackawanna & Western, the Lehigh Valley, the Long Island Railroad and the Delaware & Hudson.

On Monday the presidents issued another advertisement, appealing to the public, and reprinting another letter which had

been sent to the governor asking him to veto the bill, the fact of his signing it having at that time not been announced. In this second letter the railroads agreed to comply with any orders which the public service commissions might make in respect to the number of men required on trains, and they also offered to co-operate in securing the passage of a law giving the public service commissions full authority if anybody thought that such authority did not already exist.

The advertisement also contained letters from President Willard of the Baltimore & Ohio; President Thomas of the Nashville, Chattanooga & St. Louis; President Miller of the Chicago, Burlington & Quincy, and Vice-president Wood of the Pennsylvania lines west of Pittsburgh, telling of their experience under full crew laws. Both the house and the senate of the legislature of Tennessee have rejected a full crew bill. The statement had been made that full crew laws had been of benefit in the few states where such laws have been in force. Mr. Miller and others denied this.

On Tuesday another half-page advertisement appeared. It was known at that time that Governor Sulzer had signed the law in New York, but in New Jersey it was still unknown what action the governor would take. In this advertisement Mr. Hughart, general manager of the Grand Rapids & Indiana, Mr. Mohler, president of the Union Pacific and Mr. Bush, president of the Missouri Pacific were quoted. Mr. Mohler said that full crew bills had recently been defeated in Kansas, Nebraska, Colorado, Wyoming and Utah, it having been seen that such a law would produce an additional tax on the people, and on the railroads, without one scintilla of benefit. Mr. Bush reported a similar result in Texas.

The railroads also reprinted a letter sent to Governor Sulzer on March 29, by John B. Olmsted, formerly a member of the New York Public Service Commission, telling the governor that the commission had had two applications before it for orders requiring additional brakemen on trains; and that in one case the order had been issued, while in the other the request was denied. If the number of brakemen could be settled by the legislature, why, asked Mr. Olmsted, should not the legislature also with equal reason require a flagman at every grade crossing? Such a measure would greatly promote the safety of the public and of railway employees, but it would entail an enormous expense. Such far reaching questions should be dealt with by the public service commission, which could handle them with due deliberation and intelligence.

The railroads were not the only interests which appeared before the governor to oppose the bill. The State Grange, the State Agricultural Society and other important interests presented arguments. President E. B. Thomas, of the Lehigh Valley, presented at the hearing a petition, signed by fifty conductors of that road, declaring an extra trainman to be unnecessary. President W. C. Brown, of the New York Central, said that enginemen and conductors generally were opposed to the bill. President Peters, of the Long Island, called attention to the fact that the bill would compel his road to employ firemen on electric locomotives.

The governor in giving his approval to the bill sent also a memorandum in which he declared that a similar bill had been adopted with good results in other states.

The law provides that a freight train of more than 25 cars, running outside of yard limits, and on railroads more than fifty miles in length, must be manned with a crew of not less than one engineer, one fireman, one conductor and three brakemen; any train of five cars or more, other than a freight train, must have one engineer, one fireman, one conductor and two brakemen; and, if it is a passenger or baggage train, it must have a baggageman in addition to the crew; any freight train of twenty-five cars or less must have one engineer, one fireman, one conductor and two brakemen; and any light engine must have not less than one engineer, one fireman and one conductor or brakeman.

# RAILWAYS AND AGRICULTURE COMPARED.\*

Carriers' Outputs Increased Much More in Proportion to Facilities than Farmers', and Farm Prices Rose While Rates Stood.

The present study is a comparison of the increases in the plant and output of agriculture with the increases in the plant and the output of the railways. Bushels and bales are so different from ton-miles and passenger-miles that there cannot be any direct comparison between them, but it is fair to compare in a general way the respective ratios of increase. That is, if during an extended period the ton-miles and the passenger-miles per mile of main track have increased at a substantially greater ratio than have the bushels per acre or the bales per acre of a particular crop, it is fair to say that the railways have made greater progress in efficiency than has agriculture as measured by that particular crop. Then, again, it is perhaps true that an acre of even the most fertile soil does not have an elasticity of production comparable with the range of traffic that can be moved over a mile of railway. The practice of European agriculture, however, demonstrates a vastly greater productivity per acre than has been obtained in the United States. Therefore the present comparison of the increase in productivity is well within the limits of practicable achievement.

In the railway industry so large an initial investment in fixed plant is required in order to operate at all, that for a considerable time after being opened for traffic the plant is likely not to be fully utilized, and hence additional applications of labor and equipment are rewarded by a more than proportionate increase in output. In other words, efficiency tends steadily to increase up to the time that the plant is completely utilized. No such large initial investment is required in agriculture, and the point is more quickly reached where there is even a less than proportionate reward for each new application of capital and labor. That the point of diminishing return has been reached in the case of many railways is undoubtedly true.

It is frequently asserted that the farmer suffers from the disadvantage that the quantity of land is fixed, and that he cannot increase it at will. This impression, only in part true, probably arises from the fact that the governmental policy of free land is practically at an end, and that if the farmer wants more land, he must, as does the railway when it extends its lines, invest more capital. There is still opportunity open to the farmer to extend his productive area.

But efforts to develop efficiency meet hampering restrictions not alone in agriculture. Agriculture is not subject to such public regulation as the railways, and in the railway field much in the way of unproductive or relatively unproductive investment is demanded in the public interest. These investments, being to a considerable degree beyond the control of the railway, may hamper that development of physical plant which is best fitted to handle traffic efficiently. Again the output of the agricultural plant, eliminating natural forces, is within the control of the farmer; within a practicable limit he can produce as much or as little as he chooses, and hence the responsibility for a large or a small product per acre within this limit is his alone. The railway, on the other hand, performs a *service*, is, therefore, dependent upon patronage for its output, and hence its output is not under its sole control. The fact that it is a service which the public are obliged to use, modifies the force of this contention, but does not remove the fact that the intensiveness of traffic depends largely upon the volume of traffic offered.

These fundamental differences in the character of the agricultural and railway industries would seem on first thought to destroy the value of any comparison of their efficiency. But it must be remembered, as has been said, that the two industries are not being compared directly with each other; rather the

increase in the efficiency of each is being compared over a series of years. The record for efficiency of each industry is compared at one period with its record at another. Account is taken of the degree in which the plant of agriculture and the plant of the railways have been extended, of the aggregate increases in output of the increases in output per unit of plant, of increases in value in relation to output, and of the relation that extensions of plant and increases in output bear to the growth of population.

## COMPARISON OF PLANTS.

The physical plant of the railways of the United States comprised 206,631 miles of main track in 1900. By 1910 this had grown to 266,185 miles, an increase of 59,554 miles, or 28.8 per cent.

Improved land in the farms of the United States amounted to 414,498,000 acres in 1900 and 478,451,000 acres in 1910, an increase of 63,953,000 acres between 1900 and 1910, or 15.4 per cent.

It is evident that the railway plant has increased at nearly double the rate of the agricultural plant. Additional light is obtained by showing the rates of increase separately for the three principal districts of the United States—Eastern, Southern, and Western.<sup>a</sup>

Item.	INCREASE IN RAILWAY TRACK MILEAGE AND IN IMPROVED FARM LAND		EASTERN, SOUTHERN, AND WESTERN DISTRICTS.	
	1900.	1910.	Increase, 1900-1910.	
			Amount.	Per cent.
Eastern district:				
Railway main track...	64,537	75,129	10,592	16.4
Improved farm land..	90,921,000	89,641,000	d1,280,000	d1.4
Southern district:				
Railway main track...	33,117	43,694	10,577	31.9
Improved farm land..	82,061,000	88,353,000	6,292,000	7.7
Western district:				
Railway main track...	108,977	147,362	38,385	35.2
Improved farm land..	241,516,000	300,458,000	58,942,000	24.4

d Decrease.

## COMPARISON OF AGGREGATE OUTPUT.

Railway output in the United States in 1900 and 1910, expressed in terms of ton-miles and passenger-miles, was as follows:

	Output in—		Per cent. of increase 1900-1910.
	1900.	1910.	
Ton-miles .....	141,596,551,000	255,016,910,000	80.1
Passenger-miles .....	16,038,076,000	32,338,496,000	101.6

The immediate comparison in the case of agriculture will be concerned with the ten principal crops, those which enter into universal use and consumption and constitute over 80 per cent. of the value of all crops—corn, wheat, oats, barley, rye, buckwheat, potatoes, hay and forage, tobacco, and cotton. The area devoted to these ten crops in 1900 aggregated 274,380,000 acres, while in 1910 it was 297,865,000 acres. This area of the ten crops, representing over four-fifths of the total crop area of the United States both in 1900 and 1910, increased 23,485,000 acres during the decade, or 8.6 per cent.

The increases in the respective crops are shown by the following table:

	Production in—		Per cent. of increase, 1900-1910.
	1900.	1910.	
Corn (bushels).....	2,666,324,000	2,552,190,000	d 4.3
Wheat (bushels).....	658,534,000	683,379,000	3.8
Oats (bushels).....	943,389,000	1,007,143,000	6.8

<sup>a</sup> The Eastern district comprises the New England States, New York, New Jersey, Pennsylvania, Delaware, Maryland, the District of Columbia, Ohio, Indiana and Michigan. The Southern district includes all the States south of the Potomac and Ohio and east of the Mississippi rivers. The Western district comprises the States of Illinois and Wisconsin, and all States west of the Mississippi. As regards railway operation, the Eastern district corresponds very closely to combined Groups I, II and III of the territorial classification of the Interstate Commerce Commission; the Southern district to Groups IV and V combined; the Western district to Groups VI, VII, VIII, IX and X combined. The boundaries of the groups that lie along the borders of these districts do not always follow State boundaries; but the districts specified above so closely correspond to the combined groups of the Interstate Commerce Commission that there is no appreciable variation from strict comparability.

\*An abstract of Bulletin No. 45, Bureau of Railway Economics, Washington, D. C.



	Production in		Per cent. of increase 1900-1910.
	1900.	1910.	
Barley (bushels).....	119,635,000	173,344,000	44.9
Rye (bushels).....	25,569,000	29,520,000	15.5
Buckwheat (bushels).....	11,234,000	14,849,000	32.2
Potatoes (bushels).....	273,318,000	389,195,000	42.4
Hay and forage (tons).....	79,252,000	97,454,000	23.0
Tobacco (pounds).....	868,113,000	1,055,765,000	21.6
Cotton (bales).....	9,535,000	10,649,000	11.7

*d* Decrease.

The rate of increase in gross railway output, between 1900 and 1910, is shown to be from 80 to 100 per cent. The increase in the output of the ten crops combined, each crop being assigned a weight proportionate to its acreage, was about nine per cent.

#### COMPARISON OF OUTPUT PER UNIT OF PLANT.

Agriculture is affected directly and railway operation indirectly by climatic changes, seasonal variations, and calamities of one kind or another—factors that can neither be anticipated nor controlled. The pushing of agriculture into new fields may for a time increase output per unit, while the extension of railway lines into new territory may temporarily decrease output per unit, yet in neither case does this influence play any necessary part in determining for the time being the actual efficiency of operation. With this condition clearly in mind, it will be interesting to compare the output of agriculture and railways per unit of plant.

#### RAILWAY OUTPUT PER MILE.

	Output per mile of main track in—		Per cent. of increase 1900-1910.
	1900.	1910.	
Ton-miles .....	685,263	958,044	39.8
Passenger-miles .....	77,617	121,489	56.5

#### OUTPUT PER ACRE.

	1900.	1910.	Per cent. of in- crease, 1900-1910.
Corn (bushels).....	28.1	25.9	<i>d</i> 7.8
Wheat (bushels).....	12.5	15.4	23.2
Oats (bushels).....	31.9	28.6	<i>d</i> 10.3
Barley (bushels).....	26.8	22.5	<i>d</i> 16.0
Rye (bushels).....	12.4	13.4	8.0
Buckwheat (bushels).....	13.9	16.9	21.5
Potatoes (bushels).....	93.0	106.1	14.1
Hay and forage (tons).....	1.285	1.345	4.7
Tobacco (pounds).....	788.1	815.3	3.5
Cotton (bales).....	0.393	0.332	<i>d</i> 15.5

*d* Decrease.

The rate of increase in railway efficiency from 1900 to 1910, measured by the increase in traffic per mile of main track, is shown to be 39.8 per cent. in respect to ton-miles and 56.5 per cent. in respect to passenger-miles—that is, the increased efficiency of railway operation as a whole was not less than 40 per cent. for the decade. When each crop is given a weight proportionate to its acreage, it will be found that the average of the increases and decreases in the output per acre for the ten crops combined shows a decrease of about one per cent. None of the ten crops shows as great an increase in output per acre as 40 per cent., while the output per acre of four of the ten crops decreased. Without exception the increase in railway efficiency between 1900 and 1910, as measured by increased output per mile, seems to have been greater than the increase in the efficiency in the production of the ten crops. Four of the crops decreased in output per acre, indicating not only that there was no gain in efficiency of production, but probably an actual loss.

#### COMPARISON BY GEOGRAPHICAL DISTRICTS.

That the same general conclusion is applicable to each of the three great geographical districts of the United States—Eastern, Southern, and Western—is made clear by the comparison given below.

In the Eastern district the gain in railway efficiency ranged above 40 per cent. The efficiency of production of the eight crops, which were raised in sufficient quantities in the Eastern district to warrant comparison with the railways of that district, without exception increased at a lower rate than the 40 per cent. of the railways.

#### OUTPUT PER UNIT.

##### Eastern District.

	1900.	1910.	Per cent. of in- crease, 1900-1910.
Railways:			
Ton-miles .....	1,162,810	1,664,134	43.1
Passenger-miles .....	134,689	191,669	42.3
Agriculture:			
Corn (bushels).....	36.9	37.3	1.1
Wheat (bushels).....	13.7	17.3	26.3
Oats (bushels).....	33.6	29.3	<i>d</i> 12.8
Rye (bushels).....	12.9	13.7	6.3
Buckwheat (bushels).....	14.3	17.5	22.6
Potatoes (bushels).....	92.0	113.3	23.2
Hay and forage (tons).....	1.175	1.305	11.1
Tobacco (pounds).....	1004.8	970.8	<i>d</i> 3.4

##### Southern District.

	1900.	1910.	Per cent. of in- crease, 1900-1910.
Railways:			
Ton-miles .....	516,251	774,487	50.0
Passenger-miles .....	45,340	73,762	62.7
Agriculture:			
Corn (bushels).....	15.7	16.8	7.0
Tobacco (pounds).....	725.9	767.3	5.7
Cotton (bales).....	0.395	0.386	<i>d</i> 2.3

##### Western District.

	1900.	1910.	Per cent. of in- crease, 1900-1910.
Railways:			
Ton-miles .....	453,841	652,486	43.8
Passenger-miles .....	53,636	99,860	86.2
Agriculture:			
Corn (bushels).....	30.9	26.7	<i>d</i> 13.6
Wheat (bushels).....	12.8	15.4	20.3
Oats (bushels).....	33.5	29.7	<i>d</i> 11.3
Barley (bushels).....	26.8	22.5	<i>d</i> 16.0
Rye (bushels).....	12.8	14.2	11.4
Potatoes (bushels).....	97.5	101.9	4.5
Hay and forage (tons).....	1.370	1.404	2.5
Cotton (bales).....	0.390	0.272	<i>d</i> 30.3

*d* Decrease.

For the Southern district comparison is made between railways and the three principal crops of that district—cotton, tobacco, and corn. Railway efficiency as a whole increased something more than 50 per cent. The corn and tobacco crops show small increases in efficiency measured by production per acre—less than 10 per cent.—while the cotton crop shows a slight decrease in per-acre production, indicating no gain in efficiency of cultivation and handling.

Comparison is offered for the Western district between the railways and eight crops. Railway efficiency as a whole may conservatively be said to have gained more than 45 per cent. Of the four crops showing increased efficiency, no one has as high a rate of increase as this in output per acre, and four crops show decreases in output per acre.

The general conclusion warranted when the importance of each crop is considered in connection with its relative increase in acreage and output, is that the crop production of the United States increased at no greater rate from 1900 to 1910 than did the crop area. The same fact is presented from a different angle by the Census Bureau in the statement that there was practically no difference in the average quantity of crops produced per acre in 1900 and 1910. In contrast is the record of the railways, in which the increase of 28.8 per cent. in miles of main track was far less than the increases of 80.1 per cent. in ton-miles and 101.6 per cent. in passenger-miles; that is, the average output per mile of main track in 1910 was considerably greater than in 1900.

That the efforts put forth by the farmers of the United States during the past decade have only barely maintained the production of crops at the same level, without leading to any appreciable increase in efficiency of production, is the opinion expressed by John L. Coulter, in the article cited in the introduction. He says:

It is true that the *hope* has been, and I believe I may say that the *belief* has been, that agriculture was increasing rapidly, if not keeping pace with the increase of population. The people of the United States have been more than willing to supply the Department of Agriculture, state agricultural experiment stations, and a great variety of agricultural schools, colleges, and lecturers with all of the funds necessary, believing that all this pointed towards a larger production of goods as a basis for the food, beverage, and clothing supply of our people. Hundreds of millions of dollars have been expended for this purpose. It may seem that this expenditure has been in vain, since the average production of agriculture has not increased. But without it doubtless there would have been far-reaching decreases due to depreciation of the soil and failure of the farmers to maintain the average production secured when they first took charge. Though hundreds of millions of pages of literature have been distributed among farmers, only a small percentage has actually been read, and only a

small percentage of that read has been put into practice. It has taken almost all, if not all, of the education which has reached the farmers to date to prevent any downward movement in the quantity produced per acre of land actually cultivated.

#### CROP VALUES AND PURCHASING POWER.

In the light of this agricultural record, which shows an absence of increased efficiency in crop production, it is of interest and significance to note the extraordinary increase in agricultural prices and, in consequence, of the capital value of the agricultural industry.

According to the United States Department of Agriculture the average value of an acre's output of the ten important crops of the United States was \$9.13 in 1899 and \$15.51 in 1911, an increase of \$6.38, or 69.9 per cent.

The details for each individual crop are as follows:

Crop.	Value of an acre's output, 1911.	Per cent. of increase over 1899.
Corn .....	\$14.79	73.8
Wheat .....	10.96	50.1
Oats .....	10.98	38.3
Barley .....	18.38	70.2
Rye .....	12.96	105.1
Buckwheat .....	15.29	97.5
Potatoes .....	64.60	78.1
Hay .....	11.38	11.8
Tobacco .....	84.13	61.7
Cotton .....	20.32	52.3

Compared with the prices of things which farmers buy, the purchasing power of the crop of an average acre was greater in 1911 than in 1899 by 41.6 per cent. In other words, while there has been an increase in the market prices of such commodities as the farmer purchases in considerable quantity, the increase in the prices he receives for his crops has been so much greater that his purchasing power has been increased in considerably greater proportion. Expressing this situation in terms of the several important crops, the purchasing power of an average acre's output of corn in 1911 was 50.7 per cent. greater than in 1899; that of an average acre's output of wheat was 30.2 per cent. greater than in 1899; that of an average acre's output of cotton was 32.3 per cent. greater than in 1899.

This comparison of a farmer's purchasing ability at different periods has been carried a step further by the Department of Agriculture, to apply to specific commodities purchased and used by the farmers of the United States. While many of these commodities vary widely in grade, quality, or size, that grade or quality has in each case been selected which represents what is most generally sold to farmers, and the comparisons from year to year are always of retail prices of the same grades or qualities.

The following table shows the increase in purchasing power in 1911 over that of 1899 of the output of the average acre of corn, wheat, cotton, and of all crops, respectively, in terms of these specific commodities.

Of these Commodities	PER CENT. OF INCREASE, 1911 OVER 1899, IN THE PURCHASING POWER			
	By an average acre's output of—			
	Corn.	Wheat.	Cotton.	All crops.
Coal-Oil .....	112	83	86	99
Coffee .....	11	d 4	d 3	4
Flour .....	33	20	18	25
Lard .....	25	8	10	18
Salt .....	44	23	26	35
Sugar .....	37	19	20	29
Tin Pails .....	63	41	43	53
Overalls .....	30	13	14	23
Calico .....	33	15	16	25
Axes .....	60	38	40	50
Nails .....	68	45	47	58
Shovels .....	57	37	38	48
Steel wire .....	70	47	49	60
Hose .....	46	26	27	37
Lime .....	47	28	29	38
Paints .....	9	d 7	d 4	4
Twine .....	71	48	50	61
Stoves .....	51	30	32	42
Harness .....	45	20	22	30
Wagons—single .....	55	34	35	46
Wagons—double .....	42	23	24	33

d Decrease.

The 21 representative commodities entered in this table were taken from a list of 83 commodities in the report of the Department of Agriculture. Between 1899 and 1911 the purchasing power of the output of the average acre of crops increased in the case of 82 of these 83 staple commodities—

that is, the price received for an average acre's crop rose at a greater rate than the price paid for these commodities. The only commodity, the price of which rose faster than the prices of agricultural products, was brooms. This increase in the purchasing power of the farmer took place in face of the fact that the prices of 79 of the 83 commodities advanced.

#### POWER OF AVERAGE ACRE'S CROP TO PURCHASE TRANSPORTATION.

The amount of transportation purchasable by the output of an average acre of these same crops in 1899 and 1911 is shown in the following table:

	Corn.		Wheat.		Cotton.		All crops.	
	1899.	1911.	1899.	1911.	1899.	1911.	1899.	1911.
Ton-miles .....	1,175	1,954	1,008	1,448	1,843	2,684	1,261	2,049
Passenger-miles ....	442	749	379	555	693	1,029	474	786

The percentages of increase in the amounts of transportation purchasable with the average output of an acre are as follows:

	Corn.	Wheat.	Cotton.	All crops.
Ton-miles .....	66.3	43.7	45.6	62.5
Passenger-miles .....	69.5	46.4	48.5	65.8

#### PURCHASING POWER OF 1,000 CROP UNITS AND 1,000 TRAFFIC UNITS.

Taking the purchasing power of the farm value in 1900 of 1,000 bushels of the crops indicated, and of 1,000 bales in the case of cotton, as 100, the relative quantities of the commodities named below purchasable at wholesale with 1,000 bushels of the same crops and 1,000 bales of cotton in 1910 are as indicated in the following table:

Of these commodities.	RELATIVE PURCHASING POWER IN 1910			
	By 1,000 bushels of—			
	Corn.	Wheat.	Seven food crops.	Cotton (bales).
Farm products .....	120.7	114.0	100.1	129.5
Food .....	146.9	138.7	121.9	157.5
Cloths and clothing .....	156.7	147.9	130.0	168.0
Fuel and lighting .....	175.0	165.2	145.1	187.6
Metals and implements .....	170.2	160.6	141.2	182.5
Lumber and building materials .....	137.0	129.4	113.7	147.0
Drugs and chemicals .....	179.4	169.4	148.9	192.4
House-furnishing goods .....	172.5	162.9	143.1	185.0
Miscellaneous .....	149.7	141.3	124.2	160.5
All commodities .....	152.4	143.8	126.4	163.4
Ton-miles .....	175.7	165.8	145.7	188.4
Passenger-miles .....	187.6	177.1	155.6	201.1

Taking the purchasing power of the receipts of the railways from 1,000 ton-miles and 1,000 passenger-miles in 1900 as 100, the relative quantities of the commodities named below purchasable at wholesale with 1,000 ton-miles and 1,000 passenger-miles respectively in 1910 are as indicated in the following table:

Of these commodities.	RELATIVE PURCHASING POWER IN 1910			
	By the receipts from—			
	1,000 ton-miles.		1,000 passenger-miles.	
	1900.	1910.	1900.	1910.
Farm products .....	100	68.7	100	64.4
Food .....	100	83.6	100	78.3
Cloths and clothing .....	100	89.2	100	83.5
Fuel and lighting .....	100	99.6	100	93.3
Metals and implements .....	100	96.9	100	90.7
Lumber and building materials .....	100	78.0	100	73.1
Drugs and chemicals .....	100	102.1	100	95.7
House-furnishing goods .....	100	98.2	100	92.0
Miscellaneous .....	100	85.2	100	79.8
All commodities .....	100	86.7	100	81.2

The purchasing power of the value of 1,000 bushels of corn has risen from 100 in 1900 to 152.4 in 1910, an increase of 52.4 per cent.; similarly the purchasing power of wheat has risen from 100 to 143.8, or 43.8 per cent.; the purchasing power of cotton has risen from 100 to 163.4, or 63.4 per cent.; the purchasing power of the seven principal food crops, covered by earlier tables, has arisen from 100 to 126.4, or 26.4 per cent. The purchasing power of the receipts from 1,000 ton-miles has fallen from 100 in 1900 to 86.7 in 1910, a decrease of 13.3 per cent.; the purchasing power of the receipts from 1,000 passenger-miles has fallen from 100 in 1900 to 81.2 in 1910, a decrease of 18.8 per cent. These statistics have reference to purchasing power in general—i. e., power to purchase all commodities. When specific groups of commodities are considered, such as food, clothing, and the like, it is perceived that the purchasing power of the various crops indicated largely increased during the decade, while the power of the receipts from ton-miles and passenger-miles to pur-



chase these same commodities with but one exception decreased.

The increase in the purchasing power by crops of transportation is of course explained by the fact that in contrast to the rapid increase in the average value of farm products during the period, there has been no more than a slight variation in average receipts per ton-mile and in average receipts per passenger-mile.

Correlative with the increase in value of farm crops, and in large measure as a direct result of such increase, the value of farm property greatly increased during the decade ending in 1910. This value as a whole, including land, buildings, implements and machinery, and livestock, increased 100.5 per cent., or practically doubled. The value of farm land alone increased 118.1 per cent., an increase in average value per acre of 108.1 per cent. In the same period the cost of road and equipment of the railways increased 40.2 per cent., their gross capitalization increased 60.3 per cent., and their net capitalization increased 63.3 per cent.

#### OUTPUT OF RAILWAYS AND AGRICULTURE PER 1,000 INHABITANTS.

The next two tables present the increase or decrease in output of agriculture, and the increase in output of the railways, in relation to population, during the decade 1900 to 1910.

OUTPUT OF AGRICULTURE PER 1,000 INHABITANTS.  
(Ten Principal Crops.)

	1900.	1910.	Per cent. of increase.
Corn (bushels).....	35,085.7	27,749.6	d20.9
Wheat (bushels).....	8,665.5	7,430.3	d14.3
Oats (bushels).....	12,413.9	10,950.5	d11.8
Barley (bushels).....	1,574.3	1,884.7	19.7
Rye (bushels).....	336.5	321.0	d 4.6
Buckwheat (bushels).....	147.8	161.5	9.2
Potatoes (bushels).....	3,596.5	4,231.7	17.7
Hay and forage (tons).....	1,042.9	1,059.6	1.6
Tobacco (pounds).....	11,423.4	11,479.2	0.5
Cotton (bales).....	125.5	115.8	d 7.7

d Decrease.

OUTPUT OF THE RAILWAYS PER 1,000 INHABITANTS.

	1900.	1910.	Per cent. of increase.
Ton-mile .....	1,863,256	2,772,759	48.8
Passenger-miles .....	211,042	351,611	66.6

The output of five of the ten crops increased in relation to population during the ten years ending 1910. The largest increase per thousand inhabitants was that of barley, which was 19.7 per cent. Potato production per thousand inhabitants increased 17.7 per cent., and the production of buckwheat, hay and forage, and tobacco less than ten per cent. The remaining five crops decreased in output as related to population, rye showing a decrease of 4.6 per cent. per thousand inhabitants, cotton of 7.7 per cent., oats of 11.8 per cent., wheat of 14.3 per cent., and corn of 20.9 per cent. The output of the railways for the same period increased per thousand inhabitants, ton miles by 48.8 per cent. and passenger-miles by 66.6 per cent.

The value of the output of these ten crops and of that of the railways in relation to population is shown in the next two tables. Value in the case of agriculture is the farm value, that is, the estimated price at the farm for the crops. In the case of the railways value represents the receipts for handling traffic, and is expressed in terms of freight and passenger revenue.

VALUE OF THE TEN CROPS PER 1,000 INHABITANTS.

	1900.	1910.	Per cent. of increase.
Corn .....	\$10,898	\$15,641	43.5
Wheat .....	4,868	7,151	46.9
Oats .....	2,857	4,509	57.8
Barley .....	548	1,005	83.4
Rye .....	162	222	37.3
Buckwheat .....	76	101	34.1
Potatoes .....	1,295	1,810	39.8
Hay and forage.....	6,372	8,959	40.6
Tobacco .....	750	1,134	51.2
Cotton .....	4,260	7,650	79.6

VALUE OF OUTPUT OF THE RAILWAYS PER 1,000 INHABITANTS.

Freight revenue.....	\$13,807	\$20,936	51.6
Passenger revenue.....	4,260	6,839	60.6

The average value of the ten crops per thousand inhabitants increased 50.2 per cent. It should be noted that this relative

increase in the farm value of crops has been due entirely to the increased prices received by farmers. The five crops that relatively increased in quantity increased in value at a far greater ratio, and the value of the remaining five crops materially increased, notwithstanding the decrease in quantity. In the case of the railways, however, the increase in revenues per thousand inhabitants is about the same as the increase in ton-miles and passenger-miles, indicating that the increased revenues were due almost entirely to the increase in traffic.

## ARBITRATION OF THE FIREMEN'S WAGE CONTROVERSY.

On Thursday, John G. Walber, assistant to the third vice-president of the Baltimore & Ohio, again took the stand as a witness for the railroads. He introduced numerous exhibits to show the pay of firemen and to show the length of time they worked before they got advancement. For the number of roads covered by the exhibit there were in service, in 1908, 26,242 firemen; in 1909, 26,009 firemen; in 1910, 29,399 firemen, and in 1911, 29,161. The number promoted in 1908 was 732, or 2.78 per cent.; in 1909, 1,082, or 4.16 per cent.; in 1910, 2,869, or 9.75 per cent.; in 1911, 1,327, or 4.55 per cent.; in 1912, 2,556, or 8.41 per cent.

It was brought out that by promotion is meant the time of receipt by a fireman of his certificate. Many men, receiving certificates, continue, for some little time, to work as firemen until there is a vacancy for them as enginemen. Mr. Carter called attention to the fact that on the Boston & Maine the average time worked as fireman before promotion, in 1902, was 5.2 years, and in 1912, 8.9 years. In answer to a question from Mr. Carter, Mr. Walber said that the number of promotions in 1912 would depend on the number who had been promoted before. Some of the men who were promoted in 1909 and 1910, during the depression of business may have gone back to firing and worked as firemen for a while and when the increase came in business in 1911, these men were taken off as firemen and put on as enginemen, which made it unnecessary to promote new firemen.

Mr. Walber pointed out that on exactly the same class of engines of the Baltimore & Ohio the number of years served was 5.3 in 1908, 5.4 in 1909, 5.1 in 1910, 5.7 in 1911 and 5.4 in 1912. Mr. Carter tried to show that the Baltimore & Ohio had a particularly difficult time in keeping enginemen, but Mr. Walber would not acknowledge this.

Judge Chambers, in questioning Mr. Walber, in regard to these exhibits, said that he did not find anything in the table, on its face, to controvert the testimony that had been offered by the brotherhood that longer apprenticeship was required now and the goal of quick promotion which had been held out to the firemen is less of a goal now than it was in former times.

Mr. Walber then presented an exhibit showing that during 1910 increases in pay amounting to \$2,845,681.29 were granted to firemen; in 1911 additional adjustments involving \$189,207.41 and in 1912 adjustments amounting to \$5,312, a total of \$3,040,200.70, or 14.15 per cent. on the pay of the firemen of the railroads shown.

Mr. Carter brought out the fact that this was increases in pay which included increases due to changing men to different classes of service. He brought out also that the flat rate for certain classes of passenger engines in 1907 was \$2.30, and in 1912, \$2.40, and in freight service that the rate on a certain class of engines was \$2.80, and that in 1912 the rate on the same engines was \$3.00, a single increase of 20 cents, or about 7 per cent. Mr. Walber showed that the increases in the percentage of rates of pay amounted, in passenger service, to 9.18 per cent., and for freight to 9.61 per cent., in local and pick-up to 11.77 per cent., and went on to say that it depends altogether on the proportion of different classes of service as to what the

total increase is going to amount to. He said: "The railroad company pays this money and the firemen get it. The two things are synonymous and the railroad cannot pay unless the men get it, and the dollar paid for the increased size of the locomotive, or the dollar paid for a change for overtime regulations, or a dollar paid in a change for preparatory time buys just as much as any other dollar they get."

In the afternoon further exhibits were submitted showing increases in rates and Mr. Carter objected to these exhibits because they did not show the increases in rates on the same engine over different periods, but showed it only for the same service.

Mr. Atterbury then questioned the witness as follows:

Mr. Walber, I want to find out something here. Are you familiar with Pennsylvania rates?"

Not specifically—generally, Mr. Atterbury.

We have the middle division here.

Mr. Lee: I think, perhaps, I can ask one or two questions on that, sir, I can try to. Now take your Altoona and Harrisburg run, was that \$2.05 the rate of the firemen at that time on class E engine?

Mr. Atterbury: Yes, a passenger engine.

Mr. Lee: All engines, yes, sir.

Mr. Atterbury: All right, now is \$3.17 your minimum rate today?

Mr. Lee: Yes, sir.

Mr. Atterbury: Then the difference between \$3.17 and \$2.05, divided by \$2.05, would give you the percentage of increase on that road, would it not?

Mr. Walber: 54.6 per cent.

Mr. Lee: For that small engine?

Mr. Atterbury: All right, that is exactly the same engine?

Mr. Lee: Yes, sir.

Mr. Atterbury: So there is no question but that there is a 53 or 54 per cent. increase in the rate for firing the same engine on that particular division, is that right?

Getting down to freight service, Mr. Atterbury showed that a man got \$2.55 in 1902 if he ran an H3 engine and in 1912, \$3.62, an increase of \$1.07 on the same engine and \$3.81 for an H6 engine. The chairman asked whether the load had increased with the same engine and the witness stated that it had and that in his opinion this increase was due in part to the change in cars and in part to a change in carloading, due to larger cars.

Mr. Walber's examination continued on Friday morning. Considering 175,746 trains run in slow freight service, the average length of the run was 82.6 miles and the average hours on duty for each fireman was 11 hours 39 minutes. The average earnings of the firemen per train were \$3.73, and the average per hour on duty 32 cents. Mr. Walber states that the great number of runs of less than 100 miles for which 100 miles are paid, bring about the high average earnings per day and a rate per mile above the rate per mile shown in the schedule. He said that the Baltimore & Ohio is unfortunately situated with reference to short divisions, practically all the divisions leaving the coal districts in both directions being less than 100 miles. This factor, he claimed, made the comparison of the rate per mile entirely inadequate to convey any idea of what the men are getting for the work performed. The sheet showed that on 175,746 freight train runs the men were paid for 14 miles each, which they did not run on a mileage basis. Mr. Carter said at this point that he judged that the statement showed the total trains run by all the roads and from this it would appear that in slow freight service the freight trains only run at an average speed of  $7\frac{1}{2}$  miles an hour. Mr. Walber replied that the average time was 11 hours 39 minutes for 86 miles, and explained that the low average speed, as calculated by Mr. Carter, was brought about largely from the fact that the time began so much earlier than the train actually moved.

There then ensued a discussion between Mr. Carter and Mr. Walber. Mr. Carter finally complained to the board that the witness was attempting to browbeat him and claimed that he

should answer the questions by either yes or no. Judge Chambers stated that he thought there were some questions which could be answered by either yes or no, and Mr. Lee agreed that such an answer should be given when it was possible.

Continuing Mr. Walber showed that in passenger service, round trip for turn-around, the statement covered 52,588 trains run, including all passenger trains other than suburban, for which one or more trips or turn-around runs constitute a day's work. The average length of all such runs was 123 miles; the average time on duty was 7 hours 17 minutes; the average time from start to finish was 10 hours 32 minutes; and the average time off duty at terminal or turn-around points was 3 hours 15 minutes. The average earnings per train or per day were \$3.24, and per hour on duty 44.4 cents. The next sheet covered suburban passenger service and showed 22,487 trains reported; the average time on duty was 7 hours 58 minutes; from start to finish 11 hours 37 minutes; the average time off duty at terminal or turn-around points, 3 hours 39 minutes; the average earnings per day \$3.06, or 38.4 cents per hour.

The next statement showed the number of freight trains run, the number of trains exceeding 16 hours, and the number tied up under the 16-hour law. With a total of 309,622 trains run in the months covered by the reports there were 5,634 trains tied up under the law, or 1.8 per cent. of the trains run. The trains exceeding the 16 consecutive hours were 1,627, or three-quarters of 1 per cent. of the trains run. The average time on duty per train in excess of 16 consecutive hours was 2 hours 17 minutes. In a table which followed it showed that of the trains exceeding 16 hours, 769 were between 16 and 17 hours on the road, 624 between 17 and 18 hours, and 379 between 18 and 19 hours.

In a discussion with Mr. Carter, Mr. Lee showed that of all the cases exceeding 16 hours, 69 per cent. were in December. There was some discussion between Mr. Carter, Mr. Lee and Mr. Walber regarding the accuracy of the latter's figures and the method used in their preparation. It was brought out that a circular had been sent out to each one of the roads concerned and they had sent in the information. During this time Mr. Carter made the statement that one of the firemen's witnesses had, since he had testified, been taken out of service because of the character of his testimony. Mr. Lee stated in reply that perhaps Mr. Carter had special knowledge in this particular case which he had not, but he said that no man who honestly believed that he was testifying to the truth had any reason to fear being so disciplined or discharged, but that if he wilfully testified falsely, no matter what his situation in life, he had something to fear.

Mr. Carter afterwards went into a discussion at some length as to whether the railroads' testimony was or was not correct, and again discussed the matter of their reports to the Interstate Commerce Commission. The point he seemed most anxious to bring out was that while he believed Mr. Walber was testifying to the best of his knowledge, he was in doubt as to what the clerk who prepared the statistics might have done. Mr. Lee replied that while it would be practically impossible to bring all those who worked in the preparation of the reports to testify at the hearing, he was willing to bring as many as the board desired. When asked by the chairman if there was, on the Baltimore & Ohio, any one accountant who could come and swear to the accuracy of the statement furnished by the Baltimore & Ohio, Mr. Walber replied that the chief timekeeper, under whose direction the compilations were made, was competent to do so. Mr. Carter here explained that what he meant was that the clerks in compiling the figures showed that the increased rates would mean an increase in overtime, while the firemen claimed that with the two firemen on the large engines the overtime would be decreased.

Continuing, Mr. Walber showed that the total increase involved by the schedule requested by the firemen would be \$10,363,430, or 35.5 per cent. Of this 35.5 per cent., 10.11 per cent.



would be for second firemen; 2.52 per cent. for keeping coal within reach and 2.54 per cent. for cleaning.

The last statement shown by Mr. Walber on Friday was a comparison of the firemen's daily compensation in the eastern district for 1900 and 1911, which showed an increase of 40.5 per cent., while the increase in the retail price of food was given as 38.8 per cent.

On Saturday Mr. Walber again took the stand and submitted various exhibits, the first one showing wages paid various classes of skilled workmen according to the report of the Bureau of Railway Economics. In these exhibits certain rates of wages for bricklayers and others in building trades were shown. This exhibit agreed with a previous exhibit of the firemen. Mr. Atterbury pointed out that in Mr. Walber's exhibit he did not show blacksmiths, machinists or boilermakers, but in general his exhibit agreed with Mr. Carter and that in Mr. Carter's exhibit it would appear that blacksmiths, machinists and boilermakers are getting from 45 to 50, 55 and 60 cents an hour in the same towns where men in railroad shops are getting from 33 to 39 cents an hour. He asked Mr. Walber how he accounted for this difference. The only explanation Mr. Walber could give was that the employment is steadier in railroad work than in outside shop work. The way the exhibits were prepared was explained at some length.

On Tuesday Judge Chambers announced that a stipulation had been signed, postponing the date of final agreement from April 2 until April 23. Under the Erdman Act arbitration expenses are paid by the government, and this extension of time made it necessary to include in the stipulation an agreement that all expenses incurred after April 2 would be defrayed equally by the railroads and the firemen. It was also agreed that the award should be accepted as binding, both sides waiving the right to appeal.

At the hearing on Tuesday a number of witnesses were called by the firemen to refute specific statements previously made by the railroads. One of the witnesses stated that instead of discouraging the use of mechanical stokers, as claimed by the railroads, the firemen had favored them in every way.

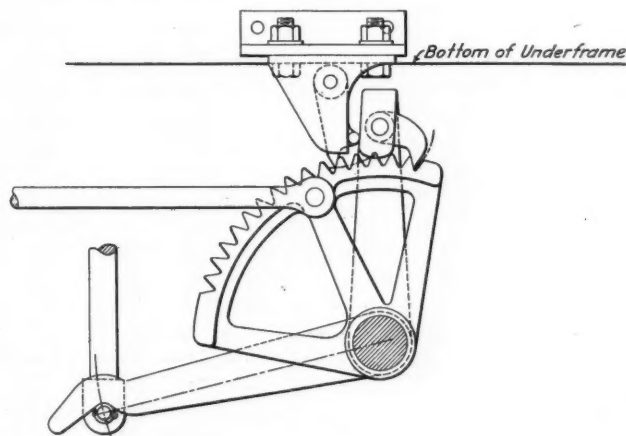
On Wednesday more witnesses were called by the firemen. One fireman from the Pennsylvania Lines West stated that in some instances automatic stokers were credited with a higher per cent. of efficiency than they really deserved. He said, further, that these reports were often exaggerated at the request of the engineer. He explained that firemen favored the mechanical stoker in the hope that it would be perfected and so reduce their labors. Other firemen testified that it was more difficult to fire a stoker engine than a stokerless one.

### AUTOMATIC BRAKE SLACK ADJUSTER.

Providing air brakes for freight cars involves a heavy expense, and yet the efficiency of this apparatus is seriously affected by the lack of automatic slack adjusters. These have been perfected for use on passenger cars, but, because of their cost, are not used on freight cars. At a meeting of the New York Railroad Club last year W. H. Sauvage made the statement that from an economical standpoint of labor and time saved in making up

long trains, and properly and uniformly adjusting the brakes, the investment required to equip cars with automatic slack adjusters would pay for itself quickly. The discussion at the same meeting indicated that there was no adjuster on the market at that time of simple construction and reasonable cost suitable for general application to freight cars.

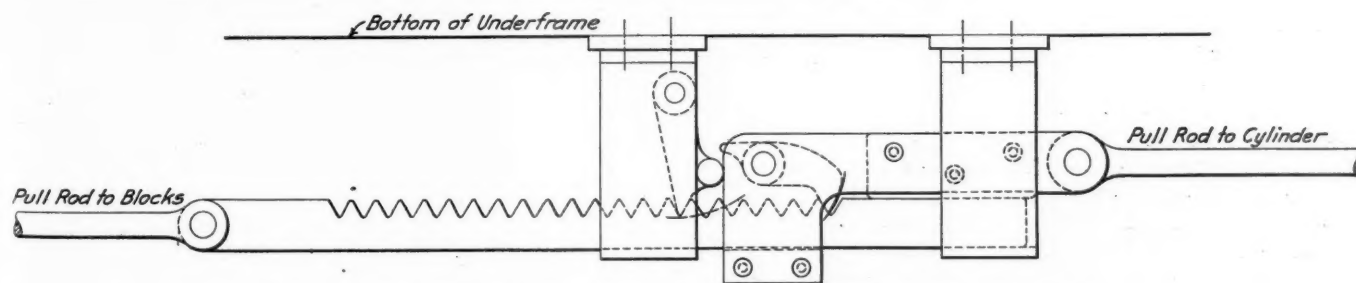
It is interesting to note that a brake slack adjuster which is said to meet these requirements is reported to be widely used on many of the leading British railways for freight equipment as well as for that in the passenger service. The same apparatus is also being used on the Indian and South American railways. The illustrations show the application of the Monarch patent automatic block adjuster made by the Monarch Controller Company, Limited, of London, England, and also the arrangement of the device as used in conjunction with the Westinghouse air brake on foreign cars. The adjuster is designed to ensure that the maximum stroke or travel of the piston in the brake cylinder does not exceed a certain distance, and immediately this stroke is completed any slack due to wear on the tire, brake shoes, etc., is taken up, thus giving a constant short travel and a



An Ordinary Form of Brake Shaft on an English Car Operated by Either Hand Lever or Vacuum Cylinder, to Which Is Attached the Quadrant Type of Monarch Brake Slack Adjuster.

more effective pull on the brake rods. It is a feature of the Monarch system that the brake shoe should be placed above the horizontal center line of the wheel in such a position that the shoe clearance and piston stroke are the same for light and loaded vehicles.

One of the difficulties to contend with in adjusting brake shoes automatically is that of keeping the clearance between shoe and tire normal, after adjustment has taken place. In the device illustrated the controlling pawl is arranged so that the normal stroke of the piston and the clearance between brake shoe and tire remain constant after the automatic adjustment has taken place. When in the off position the adjuster is locked, thus preventing any movement due to rough switching of the cars, etc. The experience of the English railways is that the device is effective and easy to maintain.



A Horizontal Type of Adjuster for Use on English Cars Fitted with Air Brakes.

# REGULATION OF THE STOCK OF MATERIAL.

The Relation of Accounting to this Problem. The Form of Such Accounts and Ends to be Served by Storehouse Accounts.

BY GEORGE G. YEOMANS.

The chief problem confronting the officer who is managing the supply department of a railroad is the regulation of the stock of material in such a way that while the work of all the different departments may proceed without interruption, the unproductive investment in idle material shall be made and kept as small as possible. A stock of material is nothing more or less than a policy of insurance on the continuity of work, and any money expended in excessive premiums on this insurance is money wasted.

The proper regulation of the stock embraces those other problems of procuring the material, of warehousing it when necessary, of distributing it expeditiously and economically, of accounting for it accurately, and of exercising at all times and places a proper police supervision over it.

Procuring material for a railroad means a great deal more than buying what is required. It means, in the first place, the originating of the requisitions on which the purchasing agent acts, the decision as to the quantities to be bought, and the time when it should be delivered; and in the second place, it means the actual control of the product of those sources of supply which the company itself may maintain and operate, so far as that product is intended for distribution and future consumption.

In other words, the operations of the machine shops, planing mills and foundries belonging to the company, with respect to their function of manufacturing any articles for future use, must be governed by the chief supply officer as effectively as he governs the operations of the purchasing department by means of the requisitions which he draws upon the purchasing agent. Where such internal sources of supply have no other function than the production of material for distribution and future use it is better that he should wholly control their operation. This applies to such facilities as the brass and iron foundries and rolling mills, which are frequently maintained by railroads in preference to procuring such supplies from commercial manufacturers, but which, as a matter of fact, produce no finished material and are sources of supply pure and simple. It does not require argument to show that if any individual is held responsible for regulating the amount of material carried in stock, he must effectively control the sources of supply, and this can be accomplished with less friction and better results if he is entrusted with their actual operation.

The manufacturing of material for future use in the regular repair shops is only incidental to their true functions, and here there can be no question of the control of their operations, except in so far as the establishment of an inflexible rule that no articles of any kind should be provided for shipment to any other point, or to be reserved for future use, without the written instructions of the officer who is directly responsible for the quantity of material in stock. In other words, this is one of the means at his command for procuring material, and his orders on the shops should be just as definite and just as binding as his requisitions on the purchasing agent, and the production of material at the shops without his sanction should no more be tolerated than the shipment of supplies by a commercial manufacturer without the written order of the company.

Having thus secured the necessary authority for procuring the requisite supplies, the first step towards a proper regulation of the stock has been taken.

The next, and perhaps even more important, step is the accounting for it in such a manner that the records may form an accurate guide to future performance. Here a distinction should be drawn between bookkeeping and storehouse accounting.

Bookkeeping contents itself with setting forth the final results

of operation, eliminating in the process those factors which offset or balance each other. It shows, perhaps correctly enough, the balance on hand at the close of the month's operations, but it does not disclose all of the computations by which that balance was reached. The balance on hand is no more important than the actual consumption; indeed, a comparison of the amount of material on hand with the amount that was in stock at some previous period is a very imperfect guide to the efficiency with which the stock is handled, because the operating conditions may be totally dissimilar; but a comparison of the material available for use with the actual current consumption is a definite and certain measure of results.

Storehouse accounting, on the other hand, must set forth in detail the steps by which those results and monthly balances are reached, so that any mis-step may be immediately detected. In order to accomplish this in the most economical manner, the methods employed must be simple, uniform, concise and accurate; and precisely to the extent which the methods employed approach these four requirements can any exact regulation of the necessary stock of material be reached.

The simplest form of accounting is manifestly a single account. In other words, there should be but one channel through which all material acquired by the company must be accounted for.

No department, save the supply department, should be permitted to carry any material in stock or to have a material account.

The entire connection of the other departments with accounting for material should consist in making the necessary requisitions on the local storekeeper; in stating on the requisitions the account to which it should be charged, or the purpose for which it is to be used; and in returning any released material or unused surplus promptly to the custody of the storekeeper and receiving from him in turn a requisition crediting its value to the account originally charged. The result of this system is a single account to which all material is debited when acquired; in which it is carried when it is not in actual service; and from which it is charged direct to the proper account when it is used, sold or otherwise finally disposed of.

The accounts must be uniform. That is, they must be in precisely the same form at all storehouses, and on all divisions, and they must apply to all material alike. While this would seem to be self-evident, it is amazing how often local irregularities creep into this feature of the work, and what incessant vigilance is required to prevent subordinate local officials from modifying the prescribed methods in a way which will tend to improve their own apparent performance when compared with that of others who are more scrupulous. The best method of insuring uniformity in the accounts is the printing of all the fundamental storehouse records, such as material classifications, stock books, price books and inventory blanks, from a single plate, so that no item will be inadvertently omitted, and so that every record will be precisely like all other records of a similar nature, wherever it is in use.

This has the added advantage of making it a simple matter to transfer a storekeeper or a clerk from one division or office to another, as he can take up the work where his predecessor left it without any hesitation or uncertainty.

While the initial outlay under such a system is comparatively large, the cost of reproduction is so materially reduced that it is cheaper in the end.

The accounts should be concise. It seems almost a misnomer to use that word in connection with any accounting system which embraces such a multiplicity of detail, but it is used in



the sense of avoiding all duplications of work. No word or figure should be written twice where once will suffice, and much can be accomplished in that respect by a carefully systematized use of the carbon sheet, and the preparation of the forms which are used in the daily transaction of the business in such a way that the original entry may be made to serve more than one purpose.

Here again the absolute uniformity of the printed page in the storehouse records comes into play, and with it should be combined a filing system so complete and so uniform, that the original authority for any entry can be produced instantly on demand.

The accounting methods must be accurate. This embraces the correctness of entry and extension, but they must also be accurate in the sense of being comprehensive and definite. It is upon the records of actual consumption and available supply that the chief supply officer must mainly rely in order to base his action in procuring material upon precise knowledge, instead of on estimates and guesswork.

Obviously, the first requisite of such a record is that it must cover all unapplied material of every nature that is in the possession of the company—not merely part of it. It is the uncharted rocks that bring disaster to many a valuable cargo, and this is one of the most prevalent causes of surplus and unproductive investment in material at the present day.

But it is not sufficient that he should have this definite information with respect to material as a whole. The chief supply officer must also have a fairly accurate knowledge of the comparative rate of consumption of different classes of material so that, in procuring it, he may assort his stock intelligently and not have the same quantity of two different kinds, when the consumption of one kind, in a given time, is double that of the other.

It is manifestly impracticable that the chief supply officer should deal, in this way, with each individual item entering into the total stock of material, but each local storekeeper should have this itemized knowledge and record, for the territory which he serves. This is obtained from his periodical inventories of all unapplied material under his charge, but primarily from his stock books, which, if properly kept, furnish exact information of the actual consumption as well as the available quantity of each particular article.

Further, such records show the fluctuations in the consumption of different materials, and the season of the year in which the use of certain articles reaches its maximum and those in which it becomes a negligible quantity, and enables him to prepare in advance to meet the demands of the service and to curtail his expenditures, also in advance, when necessity ceases to exist.

In order that the chief supply officer may have this information at his command, in sufficiently definite shape upon which to act, the various items should be classified according to character and use and combined into groups or classes of kindred articles, and a monthly classified stock report should be compiled at each storehouse, showing in general outline the exact transactions with reference to each class of material during the month.

In order to aid in securing uniformity among different railroads in this important particular, the Railway Storekeeper's Association, after mature deliberation, devised a "Standard Classification" of material which is based upon the Interstate Commerce Commission's classification of operating expenses, and it would be well if this general form could be universally adopted and followed. It contains one serious defect, however, which should be corrected in the interest of accurate stock regulation. This defect is that no distinction is made between those classes of material for which the chief supply officer can be held directly responsible, and those other classes, the quantity of which is determined by the policy of the management, or by other causes which he is powerless to regulate or control. This defect can easily be remedied by a simple rearrangement of the classes, so that the material for which the storekeeper can be held accountable appears in one group, and that which he cannot altogether

control in a separate group. In this way the performance of the individual storekeepers may be correctly gaged, and the proper assortment and regulation of the stock may be simplified.

It is evident then that there are four things which are essential to a systematic and precise regulation of the investment in material:

The first is an effective control of the sources of supply.

The second is a concentration of the accounting for all material into one channel, so that the entire situation is disclosed and there is no cross accounting or duplication of work.

The third is a uniform, concise and accurate system of accounting, from which a correct knowledge of the available supply and the actual consumption of all materials can be obtained.

The fourth is a clear and definite division of all material into a sufficient number of classes to form a reliable guide to the relative consumption of the different kinds of material, so that the total stock may be properly assorted.

The extent to which some or all of these essential features are lacking in current railroad practice very largely measures the extent of their unproductive investment in surplus and unnecessary material.

## TRANSCONTINENTAL COMMODITY RATES INCREASED.

Interstate Commerce Commissioner Clements has handed down a decision in the case involving the investigation and suspension of advances in rates by carriers for the transportation of various commodities from eastern shipping points to points in California, Oregon, Washington, and British Columbia. The full decision was as follows:

In this proceeding is involved the reasonableness of proposed transcontinental commodity rates, westbound. The rates are contained in three tariffs—Countiss's I. C. C. 952; I. C. C. 953; and I. C. C. 956. The points of origin are the same in the first-named two tariffs and embrace all points between Colorado common points and the Atlantic seaboard north of the Ohio and Potomac rivers. The only substantial difference between them is that I. C. C. 952 names rates to California terminals, such as San Francisco, and I. C. C. 953, rates to north Pacific coast terminals, including Portland and Seattle. These two tariffs contain practically the same items and rates, except that certain rates in the north coast issue are affected by the intermediate adjustment at Spokane, and therefore vary slightly from the California terminal rates. The third tariff, I. C. C. 956, names rates both to California and north coast terminals, but the territory of origin is south of the Ohio and Potomac and east of the Mississippi rivers. All three of these tariffs, which were filed to become effective September 2, 1912, have been, upon numerous protests from shippers, both from the east and on the Pacific coast, postponed in their effective dates by the commission to July 3, 1913, pending inquiry into their reasonableness. Certain other shippers at intermediate points, like Reno and Fresno, petitioned that the advances be permitted to become effective.

The territory of origin in the two tariffs first named is divided into groups from west to east. Formerly group C embraced all points east of Chicago with the exception of certain New York piers owned by the rail lines and with the exception also of New England, which were in groups A and B, respectively. The proposed tariffs make some changes in this grouping, and without reciting these changes in detail, it will suffice for this report to say that, generally speaking, group A will now embrace all points east of the Buffalo-Pittsburgh line; group B all points east of Cincinnati and Detroit to and including Buffalo and Pittsburgh; group C east of Chicago to and including Cincinnati and Detroit; group D the territory east of St. Louis to and including Chicago; and that by similarly marking these group lines farther west, St. Louis will be found to be in group E; Kansas City and Omaha in group F; Nebraska and Kansas in group G; Oklahoma, New Mexico, and parts of Texas in group

H; and Colorado and Wyoming in group J. The territory of origin in I. C. C. 956 is grouped numerically, but apparently without reference to the geographical location of each group.

It has been for many years the practice of the transcontinental rail lines to meet the rates of the steamship lines via Panama and transshipment across the isthmus by rail. Prior to the amendment of the fourth section of the act in 1910, which placed the burden of justifying a higher rate to an intermediate point included within a longer haul upon the carriers, the carriers themselves were the judge in the first instance of whether this competition existed in sufficient degree to warrant a departure from that section of the act. The transcontinental lines, therefore, upon the fact or assumption that this competition affected most commodities in some degree, or in order, perhaps, to meet some commercial or other conditions under this guise on certain of them, added commodities by a gradual process to this competitive list until they had, prior to these suspended tariffs, practically no rates to their terminals which were higher than to Reno and Spokane, and but comparatively few terminal rates as high as to the interior, the latter being cases in which the terminal rates were applied as maxima to the intermediate points.

Recently the Commission passed upon the reasonableness of rates to Reno and Spokane under the amended fourth section, and one of the main purposes of these suspended tariffs is, the carriers state, to realine their intermediate rates in substantial accordance with those findings by increasing their terminal rates to the same or a higher basis than applies to the interior on articles which do not or cannot move by water and as to which there is not therefore any real necessity for the lower rate to the terminal. The result of the carriers' expressed policy in this respect has been to thus increase by the tariffs under suspension their terminal rates principally on nonwater-competitive freight, but in certain cases also on competitive articles, as will more fully appear hereinafter. It is not to be understood, however, that only strictly nonwater-competitive articles are included in these advances, which, it may be explained at this point, can be in a general way summarized under five heads: *First.* Certain increases in minimum weights, the carriers contending that this action is justified on the commodities so affected by the increased carrying capacity of modern equipment. *Second.* Increases due to the cancellation of the commodity rate on certain less-than-carload (and a few carload) articles, the volume of rail movement of which has been in the past so small as to not justify an exception to the classification, to which such articles are accordingly returned. *Third.* Advances on certain articles which have always been and are now subject to acute competition of the steamship lines, but the rates on which, while originally low enough to secure a fair share of the traffic to the rail lines, are not now sufficiently low, in view of the more intense steamship competition in recent years, to secure to them a reasonable proportion of the transcontinental traffic. It is argued that in view of the present low rates via the water lines such articles are doubtless offered to the rail carriers for other reasons than the difference in rate, and would therefore probably be offered in practically the same volume if the rail rates were to be slightly advanced. The rates on these commodities are, however, blanketed east of the Missouri river in accordance with the practice of the carriers with respect to nonwater-competitive freight. *Fourth.* An advance on certain commodities which are not to any appreciable extent, if at all, water competitive, and which accordingly are graded up from the Missouri river east according to the group of origin, and graded also from Reno and Spokane to the final or maximum rate at the terminal. The terminal rate on these articles is blanketed also at the western end to include practically the whole state of California in the California tariff and all points west of the Columbia river in the north coast issue.

It may be explained in this connection that prior to these suspended tariffs transcontinental commodity rates were blanketed in points of origin east of the Missouri river under the

water-competitive basis which obtained, as explained, on practically all commodities, but that now, as will appear from the foregoing, while water-competitive freight is still so blanketed, the rate on noncompetitive traffic varies with the eastern group in which the point of origin is located.

It thus appears from the foregoing that the carriers will in future recognize the force of water competition only when it is actually present or reasonably to be apprehended on a given commodity and will then recognize it only in proportion to its degree. The carriers frankly admit, however, that the exact effect of this actual or potential competition is not now definitely ascertainable, and that many of the proposed rates are, therefore, experimental and will be canceled if it is found that mistakes of judgment have been made in this respect, as reflected in the future volume of the individual articles offered to them. The carriers, in fact, recognized during the progress of the hearings that such mistakes had been made on certain commodities and gave assurance that those items would be given further consideration. In this connection they also suggested that the shippers, not only of such commodities, but those interested in any of the suspended items, meet them in conference in further consideration of the entire schedules in the hope that by mutual concessions a satisfactory and equitable readjustment in the nature of a compromise could be agreed upon as to many, if not all, of the advances and such items be eliminated from controversy. Such a conference was accordingly held, and the rates on the commodities so represented at the conference were further discussed informally. Certain modifications were there agreed to by the carriers and the protests as to them accordingly withdrawn by the shippers. There still remained, however, a few commodities as to which no agreement had been reached, and these were the subject of a second informal conference between the parties before the commission at Washington. Certain of these latter items were at that conference also adjusted satisfactorily to the shippers, who accordingly withdrew their protests as to them. The result is that by this commendable co-operation on the part of both shippers and carriers there now remain but a few items as to which the parties have not agreed and the protests been eliminated. And as to these, the carriers have submitted their final suggestions, but have agreed to abide by the decision of the commission without the necessity of its making a formal order.

We shall not discuss the various rates involved in this proceeding in detail. That the changes in these tariffs are numerous follows from the mere statement that the proceeding involves a comprehensive general revision of all the transcontinental commodity rates westbound. To discuss the individual items would, therefore, but unduly lengthen the report. It may be said, however, that all parties have been given an opportunity to present evidence in support of their protests at hearings held in Washington, Portland (Ore.), and San Francisco; that opportunity has been given to present written argument on the voluminous record that has accumulated; and that oral argument has been waived by both parties.

Of the articles finally left to the commission for determination after these informal conferences referred to, furniture, tin cans, and lard pails constitute the chief items. All of these items come within the class alleged by the carriers to be nonwater-competitive, referred to under one of the previous headings, and are graded up in rate according to the proximity of the group of origin to the eastern seaboard in accordance with the practice of the carriers with respect to nonwater-competitive freight.

Most of the items of furniture have been adjusted satisfactorily to the shippers and the protests as to them withdrawn. There is one item, however, which was discussed at the hearings and in the subsequent informal conferences referred to, which, in view of the inability of the parties to agree, is now referred to the commission for determination. This item is the general furniture mixture. Taking Grand Rapids as a representative point of origin, the proposed increase is from \$2.20 to \$2.52, the



latter being in fact the third-class rate, except that it is subject to a flat minimum instead of a changeable minimum under rule 6-b of the classification. This mixture is of furniture of the better class, many of the articles being of the highest grade and price in the trade. Upon careful consideration of the evidence on this item we are not convinced that the proposed rates are unreasonable. It is therefore our opinion that they should be permitted to go into effect.

The proposed advance on tin cans is from 85 cents to \$1.15 under the suspended tariffs, but the carriers as the result of these informal conferences now voluntarily suggest, finally, a rate of \$1, minimum 22,000 pounds. The principal protestant against this advance concedes that \$1 is a low rate, but contends that on account of the low margin of profit on the commodity his sales on the coast, which now amount only to about 5 per cent. of the gross sales, will be practically eliminated. It is contended that under a rate of 95 cents some of this coast trade could be retained. The principal basis of this specific protest is the fact that the 85-cent rate has been in effect for many years and business built thereon. While we recognize some merit in the latter contention from a commercial standpoint, we do not feel justified in finding that a rate of \$1 is excessive on this traffic. It is true as pointed out by this protestant, that the proposed advance on tin plate is only from 66 $\frac{2}{3}$  cents to 70 cents. It appears, however, that the average carload of tin plate weighs at least 60,000 pounds, many cars weighing 100,000 pounds, and that the per-car earnings are much in excess of the earnings on cans, even under the proposed rates. It also appears that tin plate is not only water competitive from the eastern seaboard, but that there is substantial commercial competition from Wales.

The situation as to lard pails is closely analogous to that on cans. The principal protestant is located in Pittsburgh territory, from which the proposed advance is from 85 cents to \$1.25. The carriers now finally suggest as a compromise a rate of 95 cents, minimum 24,000 pounds. Our general remarks in reference to tin cans apply equally to lard pails.

In addition to the foregoing there are certain items on which testimony has been presented and written arguments had but which have not been represented at any of the informal conferences referred to and upon which no compromise agreement has been reached by the parties; also a few which were protested against by letter without representation at any of the proceedings before the commission. The advance proposed on some of these items has not in our opinion been justified. These items are as follows:

Fruit jars have been carried at a rate of 85 cents from Pittsburgh and 75 cents from the Missouri river both to California and north coast terminals. It is proposed to advance the rate to 85 cents from the Missouri river to the north coast, but not to advance the rate to California from the same points. There has been shown no difference in conditions at the respective terminals to warrant this discrimination.

Rope is advanced from 95 cents to \$1.10 from St. Louis to Portland and Seattle. The rate in the reverse direction is 60 cents, minimum 30,000 pounds, as carried in item 565 to Countiss's I. C. C. 958. The rate is the same in either direction between St. Louis and California terminals. We find that this advance is not warranted.

Brass rods to California terminals are reduced from \$1.25 to \$1, with an added requirement that they shall be crated, which, protestants state, increases the rate 33 $\frac{1}{3}$  per cent because of the additional weight of the crate. Brass beds made from these rods are reduced from \$1.50 to \$1.25, with no requirement as to crating. The practical result is a higher rate on the beds than on the rods from which made. The carriers concede that brass beds are nonseagoing freight and that brass rods do move via the steamship lines and that the former rate was reduced in order to permit the eastern manufacturers to compete with manufacturers on the coast. This is a discrimination which is unwarranted by the facts of record, and which

we shall leave to the carriers to correct in a suitable manner.

The minimum weight on roofing paper and felt is increased from 30,000 to 40,000 pounds in the north coast tariff, while the former minimum is retained to California. This is also a discrimination which should be removed.

Wooden washboards are advanced from \$1, minimum 24,000 pounds, to the woodenware mixture at \$1.50, minimum 16,000 pounds, from Saginaw, Mich., and Memphis, while metal washboards are retained at the former rate. We find that this advance constitutes an undue discrimination against wooden washboards.

The carriers also propose an advance of 10 cents per 100 pounds on steel products from Denver and on cement-coated nails from Chicago to north coast terminals. They state that this action was taken against their best judgment, but was necessary in order to secure a better relative adjustment at Spokane. It is stated that this advance will be voluntarily canceled if the Supreme Court decides in the cases involving the proper interpretation of the amended fourth section now before it that terminal rates lower than to the interior are lawful. It is our opinion and recommendation that this proposed rate should be suspended until the status of the Spokane and terminal rates is definitely defined by the Supreme Court.

With the exceptions noted above and of those rates voluntarily modified by the carriers following the informal conferences referred to, it is our opinion that the proposed rates are not shown to be unreasonable and that they should be permitted to become effective. It is manifest, however, from what we have said that we are not justified upon this record in expressing a final affirmative approval of every rate involved in this proceeding. But we feel, in view of what has been voluntarily done by the carriers in the way of concessions and compromise, and in view of the further modifications herein, that the proposed rates as now modified are not shown to be unreasonable as a whole.

In conclusion, we deem it appropriate to say that the action of the shippers and carriers alike in freely meeting each other in the discussion of the questions involved, with a view to a fair adjustment of differences within the requirements and provisions of the law, is gratifying.

Upon the filing of tariffs, which may be made effective upon one day's notice, containing both the modifications of these tariffs which have been voluntarily proposed by the carriers and those specifically directed herein, the order of suspension will be vacated. (26 I. C. C. 456.)

**RAILROAD CONSTRUCTION IN KOREA.**—The construction of two railroads in southern Korea has recently been authorized. One will run from Taiden southwest to the port of Mokpo, with a

branch to the port of Kusan. The other will run from Keijo northeast to the port of Genzan. The former line will be 175 miles long, and it is estimated that it will cost \$6,421,000, excluding rolling stock, which will cost about \$2,090,000. The other line will connect the port of Genzan with the line from Fusan to Keijo at Ryusan, a suburb of Keijo, via Giseifu, Tetsugen and Heiko. The total length of this line will be about 136 miles, and the cost is estimated at



\$7,165,000, in addition to \$1,022,000 for rolling stock. It was at first intended that these lines should be completed by 1921, but it was later decided to complete them by 1916.

### DAMAGE BY FLOODS TO RAILROADS.

The railways operating through the flooded districts of Ohio and Indiana experienced during last week the greatest disaster in their history. Bridges and tracks were washed out, yards and stations partially submerged, and the lines so cut up by

passenger trains are now being operated on something like regular schedules, it is even yet impossible to obtain any comprehensive statement as to the extent of the damage suffered by the roads. It is conceded that it will reach into many millions of dollars, but during the early part of the week, on account of the impairment of telegraph and telephone service, and



*Underwood & Underwood.*

**Track Undermined by Flood at East Akron, Ohio; Baltimore & Ohio.**

the floods that train service was entirely abandoned in many districts for several days, being resumed after the floods had subsided only by detouring. Although the conditions had begun to improve on Thursday and Friday of last week, and through

the widespread character of the devastation, it was difficult to obtain accurate information as to the situation.

The northern lines, including the Lake Shore, Michigan Central, Grand Trunk and the Wabash line to Detroit, suffered



*Underwood & Underwood.*

**Deraillment at Yosts, N. Y., on the New York Central.**



comparatively little damage and were used to detour trains of the other roads. On account of the extent of their trackage in southern Ohio and Indiana, the Pennsylvania lines and the Baltimore & Ohio-Cincinnati, Hamilton & Dayton system sustained the greatest damage, and the Big Four and Monon were almost completely tied up for several days, while parts of the Erie line from Hammond, Ind., to Meadville, Pa., were out of commission.

#### PENNSYLVANIA LINES.

On Tuesday and Wednesday of last week nearly all trains through Indiana and Ohio were annulled, except on the northern lines. On the Baltimore & Ohio the trouble extended from Chicago Junction, O., to Wheeling, W. Va., and both the northwest and southwest systems of the Pennsylvania lines were affected, the worst damage being at Piqua, Dayton, Columbus, Indianapolis and Logansport, and on lines approaching those cities. On the northwest system two through passenger trains were operated each day by detouring, although the 20-hour train westbound, due to arrive in Chicago on Tuesday, was nearly 26 hours late. This train had gone as far as Columbus when it was necessary to take it back to Pittsburgh, and it finally arrived in Chicago via the Lake Shore tracks from Toledo. Since Thursday, March 27, all through passenger trains on the

Cincinnati, Hamilton & Dayton has probably been the most seriously affected of all lines, although specific reports have been few, because of lack of telegraph service.

#### ERIE.

The main line of the Erie Railroad between New York and Chicago was closed from March 19 to March 21 inclusive. On the morning of March 22 this line was opened to traffic. Not a bridge was lost on the entire system and the only serious damage to any bridge was the weakening of the abutments of the bridge at Akron, Ohio. The most severe washouts on the main line were between Corry, Pa., and Marion, Ohio. From Marion to Chicago there were about 15 washouts of minor importance. While the main line was closed, traffic from Jersey City moved to Buffalo over the regular route and thence to Chicago over the Lake Shore & Michigan Southern, which was not affected.

The line to Cleveland was closed by a 1,200 ft. washout at Aurora, Ohio. A trestle over this washout was expected to be completed on April 1. While this line was being repaired, and after the main line was opened, Cleveland was reached from Akron via the Baltimore & Ohio. The line from Marion to Dayton suffered heavily and is not expected to be open to traffic until today or tomorrow. From Urbana, Ohio, to Day-



*Underwood & Underwood.*

**Flood Scene at Dayton; National Cash Register Company's Cars Used as a Bridge for Escape from the Waters.**

northwest system have been operated, except the Broadway Limited, although several trains have been consolidated. For several days the Lake Shore tracks were used from Clark Junction, Ind., to Cleveland, but by Thursday the line from Chicago to Mansfield, O., was opened, and the Erie tracks were used to Akron. For three days there was no service on the Panhandle out of Chicago, but by Monday service had been resumed to Indianapolis, Piqua, Dayton, Columbus and Louisville. A train for Columbus via the Lake Shore to Crestline was operated on March 27.

#### BALTIMORE & OHIO.

The Baltimore & Ohio succeeded in operating one through train between Chicago and the east every day, detouring over the Nickel Plate, and part of the time via the Erie, Cleveland, Akron & Columbus, and Pennsylvania lines to Ravenna, Ohio. On Monday of this week all through trains out of Chicago were resumed via Pittsburgh, and the company's own rails were used for service to Washington and New York. No. 8 out of Chicago, which had been running via Newark and Wheeling, left on Monday on its regular time for New York via Pittsburgh. Except for No. 6 between Chicago and New York through service had been practically abandoned for several days. The

ton the tracks were entirely under water. About 2,500 carloads of filling will be required to repair this section. Since this line was closed this road has had no access to Dayton.

The Erie Railroad was particularly fortunate in having a force of about 6,000 men at work on the double tracking of the main line in the immediate vicinity of the flooded district. This accounts for the promptness with which the repairs were made. On April 1 it was said at the offices of the company that as far as was known not a single car or locomotive had left the tracks. Passengers on this company's trains did not suffer very serious inconveniences, as all the longer stops were made at large towns.

#### NEW YORK CENTRAL LINES.

The line to Chicago via the Lake Shore & Michigan Southern was never closed and a large amount of traffic from foreign roads moved over it. The main line of the Cleveland, Cincinnati, Chicago & St. Louis was closed by the destruction of bridges and by serious washouts. Traffic will not be moved over it for several days, as heavy repairs are necessary. A break at Covington, Ind., was repaired on March 31, and since then traffic has moved from St. Louis via Paris, Ind., Danville, Ill., Indianapolis, Bellefontaine, Ohio, and Cleveland. Beginning March 30 a route to St. Louis was available via the C. C. C. &

St. L. to Louisville, Ky., and thence over the tracks of the Louisville & Nashville. The most serious break in the main line was the destruction of a big bridge over the Wabash at Terre Haute, Ind. This bridge was expected to be repaired by April 3. The line from Indianapolis to Chicago via Lafayette and Kankakee was closed for only a short time, and during the interval trains moved via Anderson and Elkhart to Chicago. Dayton was cut off by the destruction of two spans of the bridge over the Miami river at that point. When this bridge collapsed several freight cars fell into the river. Cincinnati was cut off by its destruction and by the fall of another bridge at Shelbyville, Ind. On April 1 connection was established to Springfield via Columbus. Cairo is cut off by heavy floods south of Lawrenceville. On April 1 access was had to all other main points on the C. C. C. & St. L., except Dayton, Cincinnati and Shelbyville. A considerable number of cars and locomotives were overturned on the tracks of this company between Springfield and Cincinnati.

By Monday the situation on the Big Four had been greatly improved and passenger service was being operated between Chicago and Indianapolis, Indianapolis and Cleveland, Cleveland and Columbus, Toledo and Springfield, Mount Carmel, Ill., and North Cairo, Ill., and on several other lines on which service had been suspended last week.

Connection was established on April 1, between Lima and Dayton via the Cincinnati, Hamilton & Dayton. The Lake Erie & Western suffered only slightly, and on April 1, was open at all points except at Cicero, Ind. This break cut off the road's approach to Indianapolis over its own tracks, but it was expected that it would be repaired by April 2.

The damage done in New York state was not so serious. A bad washout at Castleton, about three miles south of Albany, made it necessary to run from New York to Albany over the Harlem division and the Boston & Albany. This break was repaired on March 30. High water in the Mohawk valley caused delays and obliged the traffic to move over circuitous routes. Since March 30 all trains between New York and Chicago have followed their regular schedules and have been subjected to only minor delays.

The eastbound Buffalo express of the New York Central, running at about 30 miles an hour, was derailed at Yosts, N. Y., on the morning of March 30, at 2:40 o'clock, and eight sleeping cars fell down the bank at the right of the roadway, two of them lodging partly in the swollen waters of the Mohawk river. The engine and first three cars passed over in safety. Only six persons were injured, and these were not very seriously. The track had been weakened by the high water, though another train had passed over it in safety only fifteen minutes prior to the accident. The cars were of steel and their bodies were little damaged.

#### OTHER LINES.

The Chicago, Indianapolis & Louisville was blocked by a washout on the Wabash river north of Lafayette, Ind., and by the loss of bridges at this point and at Indianapolis, and all trains, except for short distances out of Chicago, were annulled until Saturday. The Chicago & Eastern Illinois suffered most from the floods in the vicinity of Terre Haute. Service from Chicago to the south via Terre Haute and Evansville, was discontinued for several days, but trains were being operated on Monday into Terre Haute via Moline and Brazil, Ind., and service was offered to Clinton, Ind., on partial schedules. A bridge across the Wabash near Vincennes was washed out.

The Wabash line from Chicago east was free from interruptions, but on the through line from St. Louis to the east the floods in the Wabash valley resulted in tracks being washed out between Logansport, Peru and Fort Wayne.

On all lines that have been opened since the flood began every effort has been exerted by the railways to hasten the passage of trains bearing supplies to the people driven from their homes, and circulars have been issued, both by the railways

and by the express companies, announcing that such supplies will be carried free when directed to properly constituted relief authorities.

The floods in the lower Ohio and the Mississippi rivers now threaten great damage. At Cairo railway traffic is already completely blocked, with a prospect of a long suspension. The height of the river on Wednesday was 54.4 ft., the highest on record, and two-thirds of the population had left the city. The Illinois Central arranged to take passengers from Chicago to Memphis by way of Thebes and the Frisco road.

## PRINCIPLES OF ELECTRIC RAILROADING.\*

BY C. L. DE MURALT,

Professor of Electrical Engineering, University of Michigan.

### I.

If we go over the list of American railroads that have thus far installed electricity as motive power on any part of their lines, we find that in almost every case the installation was planned and carried through by one of the large electric manufacturing companies. Very few individual engineers seem to possess today sufficient knowledge to design and execute work of this kind. Yet, the intricacies of the problem are after all not any greater than those connected with many another railroad question. It is my firm belief that the average man, who applies himself to the solution of these difficulties, will readily be able to get a thorough understanding of all the factors that enter into the problem. The same man, who now has to decide whether the traffic capacity of a certain division had better be increased by grade reduction or by the purchase of heavier locomotives, must be able to say whether or not electricity is advantageous for the operation of any of his lines.

To show how simple the matter really is, will be the object of this series of articles. We will first review some of the fundamental laws that underlie all propulsion of trains on tracks, by steam as well as by electricity. Then we will show how those laws affect the technical as well as the financial side of electrification. In other words we will endeavor to establish under what conditions electricity may be used advantageously as motive power in place of steam, and under what other conditions it will not pay to do so. Finally we will determine what are the advantages and disadvantages of the various types of electric locomotives now on the market and will try to find out what are the specific operating characteristics of each.

#### INTRODUCTORY.

The movement of all railroad trains is influenced by what might be termed three great natural forces, namely:

(1) Inertia, or the force of the mass, which tends to maintain the status quo and opposes any change in speed. This force tends to prevent the starting of a train from rest, and likewise also the stopping of a train from full speed.

(2) Gravity, or the force which tends to make all bodies get as near the center of the earth as possible. This force opposes the running of a train up a grade or away from the center of the earth, but it helps a train on the down grade or towards the center of the earth.

(3) Friction, or the force which opposes the motion of two bodies in contact with one another. In the case of a train, friction shows itself mainly in three forms, i. e., bearing friction, friction between wheels and rails, and friction between train and surrounding air.

To move any train we must supply an outside force of sufficient magnitude to overcome the combined influence of these three natural forces. To start the train from rest we must use up a certain amount of energy to overcome the inertia and to impart momentum to the train. As the train starts we must supply additional energy to overcome bearing, rail and wind friction. If a grade is to be taken, still more energy must be

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furnished to lift the train against the action of gravity. This latter, however, may be liberated again if the train later on runs down the same grade or a grade of similar magnitude. Finally, if we want to stop the train, we generally turn the stored up momentum into heat by the application of the brakes.

All this is perfectly plain, and the difficulty begins only when we try to get at the actual value of the various forces which have to be overcome; in other words, when we try to estimate the power which must be put into a given locomotive so that it will be able to perform a certain specific service. Even this is not so very difficult. At least it is possible to get these values with sufficient accuracy for all practical purposes. With our present knowledge of the art we may even undertake to guarantee that a certain service can be performed by the use of a certain amount of coal or a certain amount of electricity, as the case may be, after having made due allowances of course for variations in the weather and in the human element which enters into this problem due to the presence of the enginemen in the cab. In fact, contracts of this kind have already been made in several instances, and the estimated figures were checked with surprising accuracy by the figures obtained in actual service.

Before taking up a detailed discussion of the effect of each of these three forces upon the movement of the train it may be well to point out that their relative importance varies with the different kinds of railroad service. For instance, in suburban service we find inertia to be by far the most important force to be taken into consideration. It is almost altogether a problem of putting sufficient energy into the train to make a quick start and bring it up to full speed within the shortest possible time. Then, soon after full speed is reached, power is shut off, there is a little period of coasting, and then the brakes are applied and the train brought to a standstill again as quickly as possible. Gravity seldom enters into the calculation to any material extent because there are seldom any serious grades to overcome. And even friction, though present of course, is insignificant in amount as compared with inertia.

In long distance service, on the other hand, we find the influence of inertia of comparatively little importance. It is true that a certain amount of energy has to be spent to get the train under way, but when it is once started, the train is kept going at a steady speed for so long a time that the amount expended to overcome friction gets to be very much greater than that expended to overcome inertia.

In mountain service, or in any other heavy grade proposition, gravity is of course the ruling force, compared with which the other two become insignificant. It is interesting to note in this connection that, whenever means are employed to regain or recuperate the energy which is liberated by the trains on the down grade, the efficiency of this kind of service may be very much improved. This is not feasible with steam operation, but with electricity it may readily be done, and any one interested in this particular aspect of the problem might investigate what has been accomplished by the Italian State Railways on that part of their system known as the Giovi line, near Genoa. By a judicious use of a particular type of electric motor well suited for returning energy to the line on down grades, the coal consumption has been reduced in this instance by from 48 to 62 per cent.

We see therefore that these natural forces are not always to be looked upon as a hindrance to the movement of the trains. Gravity may be a help or a hindrance according to circumstances. Even inertia may be useful under certain conditions. Friction, alone, will always be an opposing force. Before any serious electrification work can be undertaken, it is necessary to calculate as closely as possible the influence of these three forces upon the movement of traffic over the given division or divisions, and in the next few articles we propose going into this matter somewhat in detail in order to show how these influences may be evaluated, and how from their evaluation we may get a very close estimate of the feasibility or non-feasibility of electric traction in any particular instance.

## General News.

The government has filed suit against the receivers of the Wabash to recover \$3,000 in penalties for alleged violations of the hours of service law.

The Chicago, Burlington & Quincy has announced that the installation of its telephone train despatching system between St. Louis and Burlington will be completed by June 1.

The new member of the Interstate Commerce Commission is named Marble. The railroads, we think, will find that he has his heart in his work.—*Philadelphia North American*.

The Western Maryland has ordered from the Western Electric Company apparatus for a telephone line to be used for train despatching between Hagerstown, Md., and Cumberland, 80 miles.

After several months of negotiations the Queen & Crescent Route has announced an increase in pay of 8 per cent. for its telegraph operators, levermen and station agents. About 400 men will be affected.

The Chicago & Alton has issued an order to all employees, directing them to take places in the smoking car when traveling in the service of the company whenever necessary, in order not to crowd out paying passengers.

The executive committee of the Chicago Association of Commerce has adopted a resolution expressing the opinion that the enactment of the full crew bill now pending in the Illinois legislature would place upon the railways an unfair burden.

The full crew law of New Jersey is noticed below. That of New York is reported on another page. The full crew bill passed by the legislature of Oklahoma, and noticed in last week's issue, was not approved by the governor, and will not become a law.

The Cleveland, Cincinnati, Chicago & St. Louis has increased the length of track-maintenance sections on its lines in central Illinois from seven to ten miles. The forces allotted to each section will be increased, and each gang will have a gasoline motor car.

The Canadian Pacific has increased the pay of locomotive enginemen on the lines east of Cartier, Ont., 10 per cent. On the lines west of Cartier and east of Fort William a small increase has been granted to enginemen on passenger trains and work trains.

Flying from Jüterbog to Ploen, Germany, March 31, two officers of the German army remained in the air six hours and nine minutes, flying between these two points, a distance of 372 miles, without a stop. This is the longest distance ever traversed by two persons in an aeroplane.

The Department of Agriculture reports that in the five years preceding March, 1912, the office of public roads of the department built 215 object-lesson roads; in all about 300 miles of road 15 ft. wide, and by expert advice aided in the formulation of more than 650 model county road systems. It has also assisted 26 states in effecting equitable state-aid plans.

Representatives of the legal department of the Chicago, Burlington & Quincy, Missouri, Kansas & Texas, Atchison, Topeka & Santa Fe, and Chicago, Rock Island & Pacific, appeared before the governor of Missouri last week and urged him not to sign the bill just passed by the legislature requiring all foreign railroad corporations either to incorporate under the laws of Missouri, or to cease doing business in the state.

Among the first contributions received for the relief of the sufferers in the storm at Omaha on March 23, were \$5,000 checks sent by H. U. Mudge, president of the Chicago, Rock Island & Pacific; W. A. Gardner, president of the Chicago & North Western; A. L. Mohler, president of the Union Pacific, and Darius Miller, president of the Chicago, Burlington & Quincy, on behalf of their respective companies.

New Jersey again takes her place as the banner state in the march of progress; the state in which the legislator and the labor leader most successfully combine to evolve new and valuable schemes for promoting the safety of the public. Assemblyman Arthur F. McGrath, of Jersey City, in bill No. 627, proposes

that the state shall prohibit a railroad from testing the diligence of its enginemen and firemen in the observance of signals. This bill provides that, in cases where tests of apparatus are to be made in the operation of trains, the railroad company shall give previous notice, in writing, to the engineman! In other words, surprise checking will become a crime.

The board of arbitration appointed several months ago to decide on the application of the employees of the Chicago surface street railways for an advance in wages, has rendered a decision allowing an increase in the maximum scale for carmen of two cents an hour under a graduated scale, in accordance with the length of service, ranging from 23 cents an hour for the first three months, to 32 cents for the sixth year. The figures in the scale awarded by the board correspond exactly with the amounts offered by the companies previous to the arbitration, with the exception that 32 cents, instead of 31 cents is allowed for the sixth year.

The Baldwin Locomotive Works, Philadelphia, in carrying freight between its shops in the city and those at Eddystone, 13 miles south of the city, seems to be independent of the locomotive. With ten five-ton Saurer gasoline trucks, a great part of the articles which have to be sent from one shop to the other are taken from the storehouse at the starting point and delivered at the door at the other end, with but one loading, and usually in a good deal less than two hours. All of the ten trucks are used most of the time in making regular trips, two round trips a day. Each truck when in regular use makes about 60 miles a day, and the cost of operation is twelve dollars per twelve-hour day; or, assuming full loads on each trip, four cents per ton per mile.

The legislature of Connecticut passed an act recently requiring all railroad ticket agents to issue free tickets for the members of the legislature at any time when they might wish to attend any meeting of the senate or house of representatives, or of a committee. Governor Baldwin promptly vetoed the bill; and the lower house, in acting on the motion to repass the bill, notwithstanding the objections of the governor, was able to muster only 39 votes in its favor, compared with 154 voting nay. The governor told the legislators that in his judgment they could not require a common carrier to carry them free, any more than they could require an inn-keeper to entertain members of the legislature free. Governor Baldwin reviewed the attempts of the legislators in past years to get around the constitutional provision forbidding anything of this kind, and he showed that definite but unsuccessful action looking to the removal of the constitutional limitation had been taken in 1885, 1889, 1891, 1893, 1895, 1902, 1903, 1905 and 1907. What a persistent idea!

#### Full Crew Law in New Jersey.

Governor Fielder of New Jersey on April 1 signed the full crew bill of that state; and New York, New Jersey and Pennsylvania now have substantially the same law. The New Jersey law goes into effect in thirty days. The presidents of the principal railroads appeared before the governor of New Jersey, as had been done in New York, and George A. Post, president of the Railway Business Association, also appeared. President Rea of the Pennsylvania told Governor Fielder that unless there was a halt in this kind of legislation, the railroads would be driven to support government ownership of railroads. Full crew bills and grade crossing bills are hurting the credit of the railroads, so that it has become increasingly difficult to raise money for improvements.

#### Railway Employees to Lose Free Transportation?

A full crew bill is pending in the legislature of Colorado. The general managers of the Colorado lines at a recent conference agreed that if this bill were passed they would issue an order prohibiting the further issuance of free transportation to the families of railroad employees and to employees themselves except when traveling on the business of the company. The position taken by the general managers in interviews is that full crew legislation is promoted by the employees, that it tends to increase the operating expenses of the companies, that in order to meet these increased expenses they must make savings in other directions, and that the most feasible way to make them would be to curtail free transportation as indicated.

The action of the general managers of the Colorado lines has attracted attention and is the subject of consideration elsewhere. The president of one of the large roads entering Chicago has made the following statement:

"The action of the Colorado lines has, of course, been discussed by railway executive officers in Chicago. The full crew legislation which is being so generally passed is promoted by railway employees. Its effect is to make it necessary to employ more men and thereby to increase operating expenses, and it is deemed by railroad officers to be unnecessary and burdensome. Such laws require that an extra man be provided in the crew of a train for whose employment there is no need either for safety or good service. The net revenues of most railways are not large enough to justify increases in expenses in some directions which are not accompanied by reductions in expenses in other directions. Various means of offsetting the increases in expenses caused by full crew legislation have been considered. The elimination of the issuance of free transportation to employees seems the most feasible and satisfactory method of meeting the situation. There are 1,700,000 railway employees in the United States. There are about five people in the average family, and assuming that each employee represents a family, they represent a total of 8,500,000 people to whom free transportation is now freely given, or about 9 per cent. of the population of the country. It is given to them not only by the lines on which those who request it are employed, but for travel on railway lines throughout the United States. The total cost to the railways of this free transportation is very large and a corresponding saving could be made by withdrawing it. It is issued entirely as a favor to the employees and is seldom or never considered by them in their demands regarding wages and conditions of work. As a class railway employees are very well paid, and therefore do not need free transportation any more than any other class of people. The railway managers would withdraw free transportation from them very reluctantly and would not do so as a matter of retaliation, but merely as a matter of business necessity. However, since the organizations of employees are the principal promoters of full crew legislation it would be simple justice that the necessary economy should be effected by withdrawing free transportation from them rather than by the adoption of some means which would affect other travelers and shippers."

#### The Ne Plus Ultra of Safety Regulation!

According to press despatches a bill is pending in the Kansas legislature to "regulate the movement" of trains at crossings. "When two trains approach a crossing," says the bill, "both shall stop, and neither shall go ahead until the other has passed by."

#### An Official Hint.

There are some few agents who still sell tickets to the nearest junction point and instruct passengers to repurchase there. These men are gradually being weeded out. An agent who will not take the trouble to sell a passenger through to destination should get out of the business, as he has no future.—*L. & N. Passenger Bulletin.*

#### Railway Legislation.

The Keckley bill to reduce intrastate freight rates in Nebraska by 20 per cent. has been defeated in the house by a vote of 48 to 46.

The attorney general of Texas has drafted a bill to be introduced in the legislature, providing that when a foreign corporation acquires the ownership of a domestic road, the stock shall be placed in the hands of trustees of the bondholders of the domestic company, and these trustees shall operate the company entirely independent of the foreign corporation that owns it. The railroad commission is authorized to make periodical examinations of the records of the company.

#### A Government Scale Testing Car.

The Bureau of Standards, Department of Commerce and Labor, utilizing an appropriation of \$25,000 which has been made by Congress for use in the next fiscal year, beginning July 1, will extend the scope of its investigation of scales in railroad



yards, grain elevators and other places where interstate traffic is handled, and will have built a test car. This car will not itself be used as a weight, but will carry movable weights, which will be used for testing. It is proposed to have the car carry a number of standard weights of 10,000 lbs. each and a large number of 50-lb. weights. A truck, capable of carrying 50 tons, will be carried on the car to be used for moving the standard weights, in testing scales. The car will be equipped with a crane for lifting the truck and the heavy weights.

S. W. Stratton, director of the bureau, says that officers of railroad terminals and of elevators have shown much interest in the activities of the bureau. Several state commissions of weights and measures are also asking for the car. The bureau will probably co-operate with the Interstate Commerce Commission in the investigation of alleged irregularities in weighing, and the car can be used, of course, to secure information as to the accuracy of shippers' scales, as well as those of railways.

#### Absurd Valuation Theories.

Estimates of losses to the railroads, caused by the floods, are necessarily only guess-work as yet. The highest figures do not seem unreasonable when one remembers the number of bridges destroyed, the miles of track washed away, the other physical property wiped out, besides the loss caused by demoralization of train service, delays, extraordinary outlay, and the future diminution of transportation business from the ruined districts. Now, we should like to ask the physical-valuation men what place in their calculations they reserve for such unforeseeable and enormous impairments of railway property. Will they undertake the role of an earthly Providence, and tell the managers just what the average loss will be from disasters of this kind, over a period of years? Or, granting that increased capital expenditure warrants higher freight charges, would they say that the thing for the railways to do would be to impose higher rates at the very moment when the people in the afflicted territory are least able to pay them? Such questions go to the heart of the theory that you can exactly and scientifically determine railroad rates by an exact and scientific physical valuation of railway property. For in the latter there are too many variables to make the process at all a safe guide. This is vividly shown just now in the blow which the railways have received through the floods. But the same thing is shown all the time in a thousand ways, less startling, but no less conclusive against the views of the rigidly doctrinaire railway valuers.—*Evening Post*, New York.

#### Reminiscences of William Mahl.

When the Supreme Court decreed that the Union Pacific should relinquish control of the Southern Pacific, one of the most troublesome problems was the question as to which road should have the men who had occupied positions of joint responsibility. In the realignment there was no doubt as to the disposition of William Mahl, who worked at Harriman's right hand for the ten most active years of the financier's life. The controller of the Union Pacific-Southern Pacific system had handled the accounts of the Huntington road for more than thirty years, and he at once elected to go with Kruttschnitt and his other old associates. Mr. Mahl has been in active railroad service for more than half a century. He is a quiet-spoken, unassuming man.

"I have had great opportunities for learning," he said. "I have worked side by side with some of the greatest railroad builders in history. There was Albert Fink of the Louisville & Nashville; Col. Scott, of the Texas & Pacific; Collis P. Huntington, who I believe built more miles of road than any other American, and Edward H. Harriman. Huntington never built a line that went into a receivership. He bought into roads that had their financial troubles, but I don't believe that any one who shared his faith and stayed with him ever lost money on one of his ventures. Huntington had wonderful patience in waiting for results."

Mr. Mahl began with the Louisville & Nashville in 1860.

"We had way bills for passengers then. When the train was ready to start the conductor was handed a sheet naming the passengers intrusted to him. 'Mrs. Smith and children, Elsie and Frank, from Lexington to Midwood,' etc., and on a separate sheet 'one colored man, from Lexington to Frankfort.' The

passenger cars were heated by round stoves, near which was piled cordwood. If the car was not warm enough for a traveler he threw on more wood. When a car was wrecked the fire poured out on the floor and the car went up quickly in flames. I remember the pleasurable excitement that followed the invention of a jacketed stove called Spear's Anti-Fire Heater. This used coal and the fire door locked, so that the stove could be stood on end without setting the car afire. When steam was introduced into the cars we paid \$500 for apparatus that we bought after the patents expired, for \$90. Most of my mementos were destroyed in the Equitable fire. I had a printed sheet saved from those days with this notice in bold type: 'Any shipment over eight tons will be charged double first-class rates.' You see, 16,000 lbs. was a car's capacity.

"The Louisville & Frankfort was started with a standard gage track. In the war this was changed to 5 ft., then back to 4 ft. 8½ in. To carry out a traffic arrangement the line was afterward changed to 5 ft. again, and then back to standard gage. We got so we could shift almost an entire line of rails simultaneously, dropping the spikes back into their old holes (!) It was comparatively easy to shorten the axles of cars and engines, but it bothered us sometimes to lengthen them.—*New York Times*.

#### The Pere Marquette Investigation.

Testifying before the legislative committee which is investigating the Pere Marquette at Detroit, F. W. Stevens, formerly general counsel of the road, on March 24, read into the record a statement of his views as to what should be done to improve the situation of the road. He said it will be a good thing for Michigan if the road is able, during the next ten years, to make such additions and improvements as the development of the state makes desirable; that in order for it to issue the necessary securities it is vital that investors should not be deterred by fears of a hostile attitude on the part of public authorities.

He therefore advocated a repeal of the state 2-cent fare law, which he said had cost the road \$3,000,000 in five years, and the passage of a new law which will recognize the difference between passenger business in sparsely settled communities and in more populous sections; a radical change in the policy of the state as to railway regulation; and the defeat of bills now pending in the legislature which would increase the expenses of the road by \$800,000 per year. He also said that the nature of the report made by the committee at the conclusion of the investigation would have an important effect on the credit of the road.

On March 25, J. L. Cramer, comptroller, was questioned at length regarding various accounts.

S. M. Felton, president of the Pere Marquette and of the Chicago Great Western, testified before the committee on March 26. He said that the combination of the Pere Marquette and the Cincinnati, Hamilton & Dayton in 1904 was unwise, and the acquisition of the Chicago, Cincinnati & Louisville a positive detriment to the Pere Marquette. As to the branches now operated, he had not yet formed a conclusion as to all, but knew that some do not pay. He considered the extension of the line to Chicago a wise move. After having been appointed receiver he had spent a great deal of time familiarizing himself with the condition of the road. At that time the roadway and track were not in good condition, but they have since been improved. The condition of the rolling stock was better, and as soon as the money can be raised additional equipment will be obtained. An effort is now being made to get more work out of the motive power.

Testifying before the committee on the following day, Mr. Felton announced that among the improvements contemplated by the receivers to increase the efficiency of the Pere Marquette are: The laying of 25,000 tons of new rails; the installation of automatic block signals; the building of a new freight terminal at Grand Rapids; grade reductions west of Plymouth; the building of double track Delray to Plymouth; the provision of additional facilities at Grand Rapids and a new freight terminal at Porter, Ind. Mr. Felton would not hazard an estimate as to the cost of putting the road in condition to meet the demands of traffic, nor an opinion as to whether it would ever pay dividends. He said the gross earnings for the fiscal year ending June 30, 1913, were estimated at \$18,000,000, compared with \$17,160,000 in 1912. He would not make any forecast

of the operating expenses, but said that the state of Michigan had increased taxes more than other states, and that the 2-cent fare law had had a serious effect on the company's earnings. In the period from 1903 to 1907, before the 2-cent law went into effect, the average fare paid per passenger was 75.7 cents. In the period from 1907 to 1912, after the law went into effect, the average fare per passenger was 66.7 cents. Mr. Felton said that two cents is not enough to pay for the luxuries in travel that the public wants. To illustrate further the situation of the road, he cited figures showing the average freight rate per ton mile, and the freight density for a number of roads, to show that while the average rate is about the same, the traffic density is much greater on the other roads, as follows:

Average freight rate per ton mile.	Road.	Tons moved one mile per mile of road.
6.4 mills.....	Pere Marquette .....	757,000
6.1 mills.....	Illinois Central .....	1,373,739
6.76 mills.....	Michigan Central .....	1,673,590
6.26 mills.....	New York Central .....	2,753,318
5.8 mills.....	Baltimore & Ohio.....	2,803,648

#### Report on Collision at Lockport, N. Y.

The Interstate Commerce Commission has issued a report by Inspector Belnap, dated March 14, giving the causes of a rear collision on the International (electric) Railway near Lockport, N. Y., January 25, about 2 a. m. One passenger and one employee were killed, the employee being the motorman of the passenger train, who is held at fault for the collision. The freight had stopped to set out some cars, and, as it was known that the passenger train, an extra, was following, had sent back a flagman. The passenger train came on at full speed, and, disregarding the red light of the flagman, ran into the rear of the standing freight, making a very bad wreck. The passenger train was an extra, which had taken a party of "Eagles" to a "smoker" at Buffalo; and the conductor and motorman being members of, or interested in the "Eagles" attended the smoker and drank some beer; at least two bottles apiece. The motorman had been on duty, off and on, since six o'clock the morning before; and although he had not worked sixteen hours altogether, within the twenty-four hour period, it is believed that he was sleeping in his cab, or at least that the lack of rest, combined with the influence of the beer, had made him oblivious to the red light of the flagman. The motorman having been killed, a chemical analysis was made of his stomach, and this revealed the presence of alcohol. Mr. Belnap says that it is bad practice for any person connected with the operation of a railroad to indulge in intoxicating liquors at any time. He also says that the rules should require the use of torpedoes by flagmen under all conditions. On this road torpedoes are required to be used only in case of fog or storm.

#### The Pullman-Car Porter.

Lemuel, our porter, is about 50, solid, round, smiling and black, as black can be. It was his proverbial good nature that invited intimacy, and as he blacked away at the shoes I got from him the outlines of the story of the day's work:

"I live on West Twenty-sixth street, New York City. I must be on duty at Hoboken at 6:30 p. m. My train leaves at 9 p. m., but I must have my car all ready, with half the berths made up. My run ends at 9 in the morning. After that I must clean and dust my car, change the linen, and make up about 10 berths so as to be ready at night. It is noon when I am done. Then I get my breakfast. I have the afternoon to myself. I go to bed somewhere. I must be at the car at quarter before 9 in the evening. The train leaves at 9:15. It reaches New York about 8 in the morning. Then I must clean and dust my car, change the linen, cross the river to my home on Twenty-sixth street, shave, wash off this Pullman dirt, get my breakfast and then go to bed. I make eight of these round-trips, one night out and the next night back. Then I am supposed to have one-round trip off. I do not get more than one-half these lay-offs, because so often there is no one to take my place. I have been on this run for 13 years. It is 650 miles round-trip. I get over four hours' sleep every day, besides the naps I catch on the way."

Of course those of us who travel with Lemuel and know him piece out his stipend by practical appreciation of his kindness and faithfulness. But it is the man and the corporation

that loom before us whenever we think of his shiny black face. Why worry about him when he does not seem to worry about himself? But he is a man, a real gentleman. He is industrious, sober, kind. He seems to act so like all true folk that some of us who know a brother human when we meet him cannot be indifferent to his long, long days of unilluminated, uninspiring grind. . . . He knows how to get along with nervous women and boorish men. But why in the name of all that is rich and reasonable in our civilization need we overwork and underpay Lemuel? Why should we scrimp his sleep to four hours in 24, with a few cat-naps thrown in?—*The Universalist Leader*.

#### American Sleeping Cars.

Perhaps if enough respectable English critics will consent to come over here and inspect our sleeping cars and then go back home to write of their discomforts, their shocking lack of privacy, their immodesty, and so on, we shall the sooner see that the critics are perfectly right. No one of intelligence that we have ever heard of defends the American sleeping car. And yet the sleeper trundles stuffily on, mingling the breathings of the inmates, re-echoing the snores of the few who are able to sleep at all, revealing all stages of deshability that in any other circumstances would be blushed for, and causing unanimous curses. The Pullman people go on doggedly building sleepers that no other country would dream of using, and the railroads go on permitting such cars to be run in their night trains. We know of no other defiance of public sentiment to compare with this.—*Lowell Courier-Citizen*.

#### MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

- AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass. Convention, May 6-9, St. Louis, Mo.
- AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Boston, Mass. Convention, May 20, Chicago.
- AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—W. C. Hope, New York.
- AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, East St. Louis, Ill. Annual meeting, June 17-20, Buffalo, N. Y.
- AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—E. H. Harman, St. Louis, Mo.; 3d Friday of March and September.
- AMERICAN ELECTRIC RAILWAY ASSOCIATION.—H. C. Donecker, 29 W. 39th St., New York.
- AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOC.—George Keegan, 165 Broadway, New York. Meetings with Am. Elec. Ry. Assoc.
- AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York. Next meeting, May 21, New York.
- AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Convention, October 21-23, 1913, Montreal.
- AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago.
- AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago. Convention, June 11-13, Atlantic City, N. J.
- AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—A. R. Davis, Central of Georgia, Macon, Ga.
- AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.; annual, June, 1913.
- AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., New York; 1st and 3d Wed., except June and August, New York.
- AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—J. R. Wemlinger, 11 Broadway, New York; 2d Tuesday of each month, New York.
- AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.
- AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Baltimore, Md. Next convention, January 20-22, 1914, New Orleans, La.
- ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago. Annual meeting, May 28, Atlantic City, N. J.
- ASSOCIATION OF RAILWAY CLAIM AGENTS.—J. R. McSherry, C. & E. I., Chicago. Next meeting, May, 1913, Baltimore, Md.
- ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago. Semi-annual meeting, June, 1913, Atlantic City, N. J.
- ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 112 West Adams St., Chicago; annual, May 20, 1913, St. Louis, Mo.
- ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York.
- ASSOCIATION OF WATER LINE ACCOUNTING OFFICERS.—W. R. Evans, Chamber of Commerce, Buffalo, N. Y. Annual meeting, October 8, Philadelphia, Pa.
- BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—H. A. Neally, Joseph Dixon Crucible Co., Jersey City, N. J. Meeting with American Railway Bridge and Building Association.
- CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and Aug., Montreal.
- CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursday, Montreal.



**CAR FOREMEN'S ASSOCIATION OF CHICAGO.**—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.

**CENTRAL RAILWAY CLUB.**—H. D. Vought, 95 Liberty St., New York; 2d Thurs. in Jan. and 2d Fri. in March, May, Sept., Nov., Buffalo, N. Y.

**CIVIL ENGINEERS' SOCIETY OF ST. PAUL.**—L. S. Pomeroy, Old State Capitol building, St. Paul, Minn.; 2d Monday, except June, July, August and September, St. Paul.

**ENGINEERS' SOCIETY OF PENNSYLVANIA.**—E. R. Dasher, Box 704, Harrisburg, Pa.; 1st Monday after 2d Saturday, Harrisburg, Pa.

**ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.**—E. K. Hiles, Oliver building, Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.

**FREIGHT CLAIM ASSOCIATION.**—Warren P. Taylor, Richmond, Va. Next convention, June 18, Bluff Point, N. Y.

**GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.**—E. S. Koller, 226 W. Adams St., Chicago; Wed. preceding 3d Thurs., Chicago.

**INTERNATIONAL RAILWAY CONGRESS.**—Executive Committee, 11, rue de Louvain, Brussels, Belgium. Convention, 1915, Berlin.

**INTERNATIONAL RAILWAY FUEL ASSOCIATION.**—C. G. Hall, 922 McCormick building, Chicago. Annual meeting, May 21-24, Chicago.

**INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.**—Wm. Hall, 829 West Broadway, Winona, Minn. Next convention, July 22-25, Chicago.

**INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.**—A. L. Woodworth, Lima, Ohio. Annual meeting, August 18, Richmond, Va.

**MAINTENANCE OF WAY MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.**—W. G. Wilson, Lehigh Valley, Easton, Pa.

**MASTER BOILER MAKERS' ASSOCIATION.**—Harry D. Vought, 95 Liberty St., New York. Convention, May 26-29, 1913, Chicago.

**MASTER CAR BUILDERS' ASSOCIATION.**—J. W. Taylor, Old Colony building, Chicago. Convention, June 16-18, Atlantic City, N. J.

**MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOC. OF U. S. AND CANADA.**—A. P. Dane, B. & M., Reading, Mass. Annual meeting, September 9-12, Ottawa, Can.

**NATIONAL RAILWAY APPLIANCE ASSOC.**—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Meetings with Am. Ry. Eng. Assoc.

**NEW ENGLAND RAILROAD CLUB.**—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.

**NEW YORK RAILROAD CLUB.**—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August, New York.

**NORTHERN RAILROAD CLUB.**—C. L. Kennedy, C., M. & St. P., Duluth, Minn.; 4th Saturday, Duluth.

**PEORIA ASSOCIATION OF RAILROAD OFFICERS.**—M. W. Rotchford, Union Station, Peoria, Ill.; 2d Thursday.

**RAILROAD CLUB OF KANSAS CITY.**—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.

**RAILWAY BUSINESS ASSOCIATION.**—Frank W. Noxom, 2 Rector St., New York. Annual dinner, second week in December, 1913, New York.

**RAILWAY CLUB OF PITTSBURGH.**—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.

**RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOC.**—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Assoc. Ry. Elec. Engrs.

**RAILWAY GARDENING ASSOCIATION.**—J. S. Butterfield, Lee's Summit, Mo. Next meeting, August 12-15, Nashville, Tenn.

**RAILWAY DEVELOPMENT ASSOCIATION.**—W. Nicholson, Kansas City, Southern, Kansas City, Mo.

**RAILWAY SIGNAL ASSOCIATION.**—C. C. Rosenberg, Bethlehem, Pa. Meetings, June 10-11, New York; convention, October 14, Nashville, Tenn.

**RAILWAY STOREKEEPERS' ASSOCIATION.**—J. P. Murphy, Box C, Collinwood, Ohio. Annual convention, May 19-21, Chicago.

**RAILWAY SUPPLY MANUFACTURERS' ASSOC.**—J. D. Conway, 2135 Oliver bldg., Pittsburgh, Pa. Meetings with M. M. and M. C. B. Assocs.

**RAILWAY TEL. AND TEL. APPLIANCE ASSOC.**—W. E. Harkness, 284 Pearl St., New York. Meetings with Assoc. of Ry. Teleg. Sups.

**RICHMOND RAILROAD CLUB.**—F. O. Robinson, Richmond, Va.; 2d Monday except June, July and August.

**ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.**—L. C. Ryan, C. & N. W., Sterling, Ill. Convention, September 8-12, 1913, Chicago.

**ST. LOUIS RAILWAY CLUB.**—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.

**SIGNAL APPLIANCE ASSOCIATION.**—F. W. Edmonds, 3868 Park Ave., New York. Meetings with annual convention Railway Signal Association.

**SOCIETY OF RAILWAY FINANCIAL OFFICERS.**—C. Nyquist, La Salle St. Station, Chicago.

**SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.**—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala. Next meeting, April 17, Atlanta, Ga.

**SOUTHERN & SOUTHWESTERN RAILWAY CLUB.**—A. J. Merrill, Grant bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept., Nov., Atlanta.

**TOLEDO TRANSPORTATION CLUB.**—J. G. Macomber, Woolson Spice Co., Toledo, Ohio; 1st Saturday, Toledo.

**TRACK SUPPLY ASSOCIATION.**—W. C. Kidd, Ramapo Iron Works, Hillsburn, N. Y. Meeting with Roadmasters' and Maintenance of Way Association.

**TRAFFIC CLUB OF CHICAGO.**—Guy S. McCabe, La Salle Hotel, Chicago; meetings monthly, Chicago.

**TRAFFIC CLUB OF NEW YORK.**—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August, New York.

**TRAFFIC CLUB OF PITTSBURGH.**—D. L. Wells, Erie, Pittsburgh, Pa.; meetings monthly, Pittsburgh.

**TRAFFIC CLUB OF ST. LOUIS.**—A. F. Versen, Mercantile Library building, St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

**TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.**—J. F. Mackie, 7042 Stewart Ave., Chicago. Annual meeting, June 17, Los Angeles, Cal.

**TRANSPORTATION CLUB OF BUFFALO.**—J. M. Sells, Buffalo; first Saturday after first Wednesday.

**TRANSPORTATION CLUB OF DETROIT.**—W. R. Hurley, L. S. & M. S., Detroit, Mich.; meetings monthly.

**TRAVELING ENGINEERS' ASSOCIATION.**—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y. Annual meeting, August, 1913, Chicago.

**UTAH SOCIETY OF ENGINEERS.**—R. B. Ketchum, University of Utah, Salt Lake City, Utah; 3d Friday of each month, except July and August.

**WESTERN CANADA RAILWAY CLUB.**—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.

**WESTERN RAILWAY CLUB.**—J. W. Taylor, Old Colony building, Chicago; 3d Tuesday of each month, except June, July and August.

**WESTERN SOCIETY OF ENGINEERS.**—J. H. Warder, 1735 Monadnock block, Chicago; 1st Monday in month, except July and August, Chicago.

## Traffic News.

J. D. Brown, assistant general passenger agent of the Erie Railroad, at Cleveland, has counted up the number of students enrolled in four-year courses in the agricultural colleges of Massachusetts, New York, Pennsylvania and ten central states; and he finds that the total number enrolled last year, 6,801, was 22 per cent. greater than the number enrolled in the same colleges in the year preceding.

The number of immigrants (mainly from Europe) arriving in New York harbor during the three months ending March 31, was fifteen per cent. larger than the number arriving during the same quarter of the preceding year, the totals by months being as follows:

	1913.	1912.
January .....	36,892	30,877
February .....	50,964	39,890
March .....(approximate)	89,911	83,608
Total .....	177,767	154,375

The governor of Maine has appointed two citizens of that state to take part in the "New England railroad conference," the board to represent the six New England states, which was proposed by Governor Foss, of Massachusetts. The appointees are Mr. Emery, formerly chief justice of the state, and Colonel Osgood, of Lewistown.

Governor Felker of New Hampshire, in a special message to the legislature, which body, in connection with the agitation over the proposed Grand Trunk line and proposed measures in relation to the Boston & Maine, has been considering freight rates for a long time past, recommends that the present rates on the roads of that state be legalized for two years, and that, in the meantime, the Public Service Commission, in co-operation with the railroad companies, prepare new tariffs, to be submitted to the legislature in 1915.

The Belt Railway of Chicago announces that arrangements have been perfected for handling less than carload shipments from industries on its rails. Shipments of 10,000 lbs. or more of miscellaneous freight for any number of roads may be loaded into a car at an industry, and will be moved free of charge to a transfer station at Clearing, where they will be transferred into cars for the outbound stations of each of the various roads. Shipments from industries on connecting lines will also be received under the same conditions, and switched free from the junction point of the connecting line to Clearing.

### Summary of Revenues and Expenses of Steam Roads in January.

The Bureau of Railway Economics' summary of revenues and expenses and comments thereon for January, 1913, are as follows: The railways whose returns are included in this bulletin operate 220,821 miles of line, or about 90 per cent. of the steam railway mileage of the United States. Total operating revenues for the month of January, 1913, amounted to \$241,196,559. Compared with January, 1912, the total operating revenues of these railways show an increase of \$37,250,850. These total operating revenues per mile of line amounted to \$1,092 in January, 1913, and \$933 in January, 1912, an increase of \$160, or 17.1 per cent. Freight revenue per mile increased 20.1 per cent., and passenger revenue per mile 10.1 per cent.

Operating expenses amounted in January to \$178,405,387. This was \$18,883,789 more than for January, 1912. These operating expenses per mile of line amounted to \$808 in January, 1913, and \$730 in January, 1912, an increase of \$78 per mile, or 10.7 per cent. All the five primary operating expense accounts showed increases per mile over 1912.

Net operating revenue amounted in January to \$62,791,172. This was \$18,367,061 more than for January, 1912. Net operating revenue per mile of line amounted to \$284 in January, 1913, and \$203 in January, 1912, an increase of \$81 per mile.

Taxes for the month of January amounted to \$10,116,824, or \$46 per mile, an increase of 4.6 per cent. over January, 1912.

Operating income amounted in January to \$238 per mile of line, and in January, 1912, to \$158. This was an increase of \$80, or 50.6 per cent. Operating income for each mile of line for each day in January averaged \$8, and for January,

1912, \$5. The operating ratio for January was 74.0 per cent., which is comparable with 69.0 per cent. in December, 1912, and 78.2 per cent. in January, 1913.

The railways of the eastern district show an increase in total operating revenues per mile of line as compared with January, 1912, of 17.1 per cent., the railways of the southern district an increase of 16.9 per cent., and the railways of the western district an increase of 17.7 per cent. Operating expenses per mile increased 13.0 per cent. on the eastern railways, 8.4 per cent. on the southern railways, and 9.6 per cent. on the western railways. For the eastern railways net operating revenue per mile increased 32.0 per cent., for the southern railways it increased 47.1 per cent., and for the western railways it increased 46.6 per cent. The increase in taxes per mile was 2.6 per cent. in the eastern district, 7.7 per cent. in the southern district, and 6.2 per cent. in the western district. Operating income per mile increased 40.2 per cent. in the east, 56.1 per cent. in the south, and 60.9 per cent. in the west.

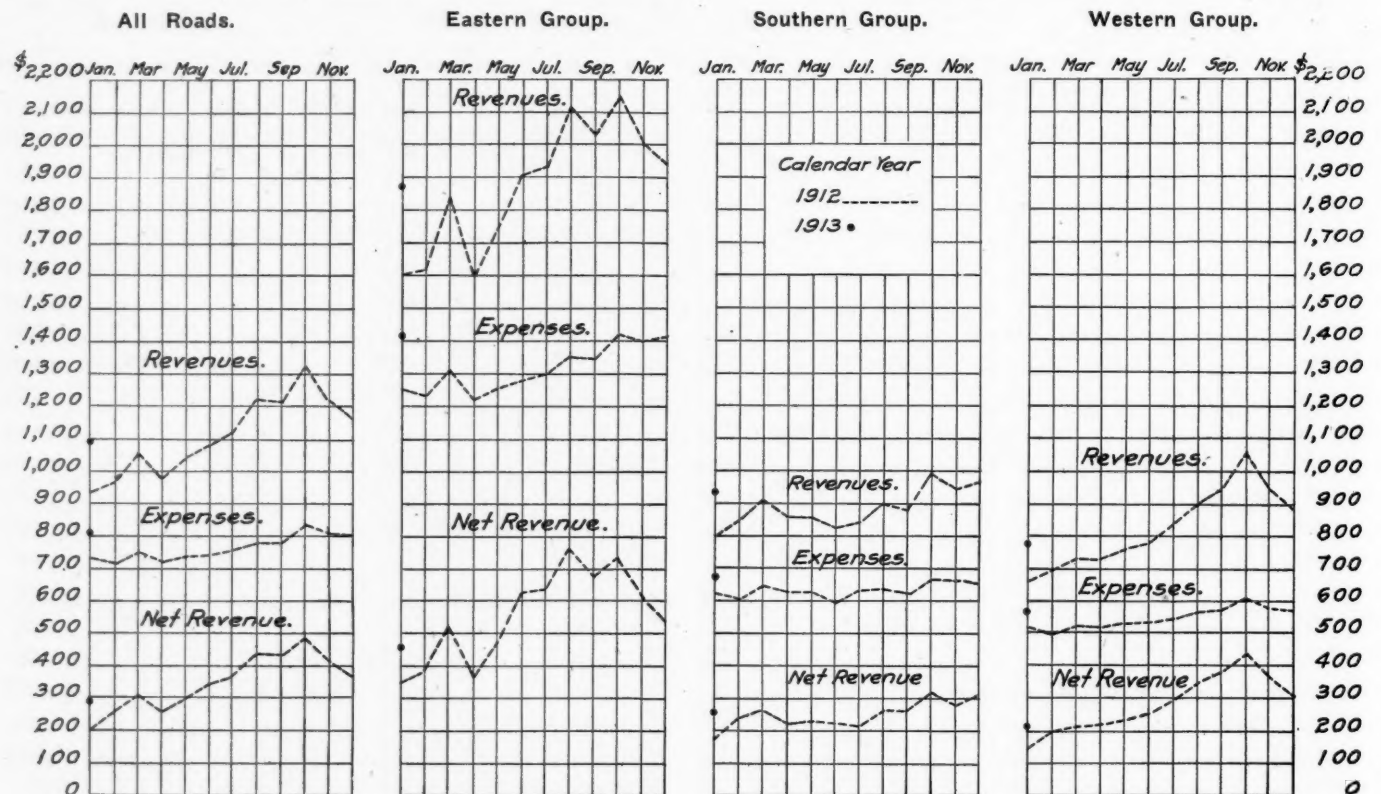
Comparison of the returns for the seven months of the fiscal year with those of the corresponding months of the previous fiscal year reveals an increase in total operating revenues per mile of 10.8 per cent., an increase in operating expenses per

#### INTERSTATE COMMERCE COMMISSION.

The extensive giving of free passes to shippers, city officers, judges and others by the railroads of Colorado has been investigated by the commission, and Commissioner Harlan, who went to Colorado, says that there was an "orgy of petty graft." He says that the railroads have promised to carry out the wishes of the commission; but it is reported that criminal indictments, against both carriers and shippers have already been returned.

David E. Brown, special examiner, has laid before the Interstate Commerce Commission 147 reports of the work of himself and his assistants in the examination of the accounts of the New York, New Haven & Hartford and its controlled properties. Seventy of these reports deal with the New England Navigation Company and fifteen with Rhode Island Electric lines; eight with the Connecticut Company, and thirteen with the Consolidated Railway Company, which operates electric lines in Connecticut.

The express companies—the Adams, the American, the United States, the Southern and the Wells-Fargo, presented arguments



Monthly Revenues and Expenses per Mile of Line in 1912 and 1913.

mile of 9.5 per cent., and an increase in net operating revenue per mile of 13.6 per cent. This net operating revenue per mile of the eastern railways increased 11.0 per cent. as compared with the corresponding period of the previous year, that of the southern railways increased 6.0 per cent., and that of the western railways increased 18.7 per cent.

The diagram shows the variations in operating revenues, operating expenses, and net operating revenue per mile for the separate months of the calendar year 1912 and for January, 1913. The following table shows the per cent. of operating revenues consumed by each class of expenses:

	PER CENT. OF TOTAL OPERATING REVENUES.					
	January		Fiscal year ending		Calendar year ending	
	1913.	1912.	1912.	1911.	1912.	1911.
Maintenance of way and structures	12.3	11.6	12.7	12.9	12.8	12.7
Maintenance of equipment.....	17.8	18.4	15.8	15.5	16.0	15.7
Traffic expenses.....	2.1	2.3	2.2	2.2	2.0	2.1
Transportation expenses.....	39.2	43.0	35.9	35.5	35.5	35.4
General expenses.....	2.6	2.9	2.5	2.5	2.4	2.5
Total operating expenses.....	74.0	78.2	69.1	68.6	68.7	68.4

at Washington April 1, against the proposed decreases in rates which have been proposed by the Commission. Walker D. Hines appeared for all five companies. He said that the estimates which had been made by the companies last year, had been wholly upset by the loss of business occasioned by the introduction of the parcel post. During the month of January, the business of the express companies, in packages weighing less than 11 lbs., had fallen off about 18 per cent., and in February about 27 per cent. In February the greatest loss reported was that by the Adams Express, which was 30.5 per cent., and the lowest was that reported by the United States Company, 22.8 per cent. Mr. Hines estimated that if the reduced rates proposed by the commission were applied to all of the present business of the companies, the loss in gross revenue would be \$26,000,000 a year. The attorney of the New York Chamber of Commerce attacked Mr. Hines' statement as purely hypothetical, declaring that the present rates are excessive, that the proposed new rates would be reasonable, and that, under the present contracts, the express companies are making excessive allowances to the railroad companies.



**Complaint Dismissed.**

*Robinson Land & Lumber Company v. Mobile & Ohio.*  
*Opinion by the commission:*

The commission found that an advance from approximately 4 cents to 5 cents per 100 lbs. in the rate on lumber from Chicora, Miss., to Mobile, Ala., had been justified by the defendants. (26 I. C. C., 427.)

*Little Rock Chamber of Commerce v. St. Louis, Iron Mountain & Southern et al.* *Opinion by the commission:*

In this case the complainant contended that the rates on cement from St. Louis, Mo., and from Eagle Ford and Harry's, Tex., to Little Rock, Ark., were unreasonable. From St. Louis, the rate is 17 cents per 100 lbs., and from Eagle Ford and Harry's, 19 cents. The commission found that the evidence was not conclusive. (26 I. C. C., 341.)

*St. Louis Blast Furnace Company v. Louisville & Nashville et al.*

*A. P. DeCamp, as lessee of the St. Louis Blast Company v. Baltimore & Ohio et al.* *Opinion by Commissioner Meyer:*

The complainant contends that the rate of \$2.80 per net ton charged for the transportation of coke from points in Virginia, West Virginia and Pennsylvania to Carondelet, Mo., are unreasonable to the extent that they exceed \$2.23 per net ton. Reparation is asked. The commission found that the evidence was not conclusive. (26 I. C. C., 355.)

*May Brothers et al. v. Yazoo & Mississippi Valley Railroad Company et al.* *Opinion by Commissioner Clements:*

Upon complaint that the provisions in the defendants' tariffs for the application of gross or flat rates on shipments of logs from points on their lines in Mississippi to Memphis, Tenn., and the refund of a portion thereof upon shipment of the products via the lines of either of them, result in unjust and unreasonable charges for the movement of the logs from the forests to Memphis; the commission found that the gross rates were not shown to have been unreasonable. (26 I. C. C., 323.)

*Proprietary Association of America v. New York Central & Hudson River et al.* *Opinion by the commission:*

In this complaint the complainant contends that the rates charged for the transportation, between interstate points in official classification territory, of certain printed advertising matter consisting of circulars, pamphlets, almanacs, etc., in less than car load quantities are unreasonable. These articles are rated first-class in less than carloads in official classification, and the complainant asks that they be accorded a fourth class rate. The commission found that the rates complained of were not shown to have been unreasonable. (26 I. C. C., 318.)

*American Brake Shoe & Foundry Company v. Alabama Great Southern et al.* *Opinion by the commission:*

Two shipments of brake shoes were transported from Chattanooga, Tenn., to Houston, Tex., on which charges were collected on the joint through carload rate of 30 cents per 100 lbs., minimum weight 40,000 lbs. Under contract between shipper and the Houston & Texas Central, the consignee, the former was to assume the freight charges up to New Orleans, and the benefit is claimed of the less-than-carload rate to that point of 22 cents per 100 lbs. at actual weight. The commission found that the charges had been properly assessed. (26 I. C. C., 446.)

*Max O'Brien et al. v. Southern Pacific et al.* *Opinion by Commissioner McChord:*

The complainants contend that certain rates charged by the defendants were invalid because the defendants had not posted them in the stations at the proper time. The commission found that while the posting of tariffs is required by the act and while a failure to post the same may subject the carriers to penalties, the failure to obey the law in this respect does not invalidate the tariff when it has been properly filed with the commission. The commission decided that the rates complained of were legal as the supplements containing them were published and filed with the commission as required by law. (26 I. C. C., 322.)

*W. Nelson Edelsten v. Pennsylvania Railroad Company et al.* *Opinion by the commission:*

The complainant purchased a mileage ticket entitling the bearer to 1,000 miles of transportation over the lines of the defendants. This ticket was destroyed by accident after coupons representing 200 miles' travel had been used. The following

conditions were printed on the ticket: "If this ticket is lost, mislaid or stolen, it will not be replaced, nor will any refund be made on such account." The defendant refused to refund the value of the unused portion of the mileage book on account of this condition. The commission found that as this ticket was sold at a reduced rate and that the conditions printed on the ticket were not unreasonable the defendant should not be required to make any refund. (26 I. C. C., 359.)

*Robertson Paper Company v. Rutland Railroad et al.* *Opinion by the commission:*

Transcontinental rates on plain manila wrapping paper in carloads are 75 cents per 100 lbs.; on the same paper oiled or greased 90 cents; and on waxed paper \$1.20. On a petition alleging unreasonableness, and undue prejudice in the rates on oiled, greased, and waxed papers and praying that the 75-cent rate be made applicable on all wrapping papers, the commission found that wrapping paper, as understood in the paper trade, is a generic name covering many grades; that oiled, greased, and waxed papers are separate and distinct commodities not only from the plain paper from which they are made, but also from each other; and that the rates applied on oiled and waxed papers were not shown to have been unreasonable. (26 I. C. C., 430.)

*Railroad Commission of Montana v. Northern Pacific et al.* *Opinion by Commissioner Clements:*

In this case the complainant contends that the rates on mining machinery in carload and less-than-carload quantities from Butte, Mont., to points in Idaho and Washington are unreasonable. No one directly connected with the Butte Machinery Company, on whose behalf the complaint was filed, was present at the hearing, and the representative of the Railroad Commission of Montana, the only witness on behalf of the complainant, had no knowledge of the character or the extent of the business of that company. The commission found that if it condemned the present rate it would be acting upon no evidence or information except a comparison of rates pointed out from tariffs on file with the commission by the Railroad Commission of Montana. The complaint was dismissed without prejudice. (21 I. C. C., 407.)

*Kalmbach-Ford Company, Ltd., v. Kansas City Southern et al.* *Opinion by Commissioner Clements:*

The complainant seeks the establishment of a differential between the rates on corn and corn products from Kansas City and common points to Shreveport, La. It was not contended that the present rate on corn is unreasonable. The complainant also alleges that it is discriminated against in favor of millers at points in Texas, Arkansas, Missouri and Lake Charles, La., who receive lower rates on corn than on corn products received from Kansas City. The commission found that as a rule a reasonable differential was approved between raw material and manufactured articles, but that wherever the carrier has waived the privilege of a slightly advanced rate for the transportation of the product and where the rate on the raw material was reasonably low, the rate adjustment should not be interfered with. (26 I. C. C., 289.)

*American Insulated Wire & Cable Company v. Chicago & North Western et al.* *Opinion by the commission:*

The defendants charge for transportation of copper wire in carloads from Dollar Bay, Mich., to Chicago, a rate of 15 cents per 100 lbs. during the months when navigation on the great lakes is open, and a rate of 22 cents per 100 lbs. during the months when such navigation is closed. The complainant contends that the higher rate is in contravention of the last clause of the fourth section of the act to regulate commerce, and is in itself unreasonable. The commission found that the maintenance of varying rates on copper wire from and to the points in question, depending on whether the great lakes are open or closed to navigation, is not in contravention of the statute, also that 22 cents per 100 lbs. is not shown by the evidence to be an unreasonable rate for the service during the months when that rate is applied. (26 I. C. C., 415.)

*News-Times Publishing Company v. the Atchison, Topeka & Santa Fe et al.* *Opinion by the commission:*

The complainant contends that the through first-class rate of \$2.34 per 100 lbs. charged for the transportation of supplements to its paper known as the *Sunday Magazine* of the *Rocky Mountain News*, from New York to Denver, Colo., is unreasonable.

In official and western classification magazines are rated first-class. The complainant contends that the publication in question should be grouped with other newspaper supplements, which take the second class rate of \$1.91 per 100 lbs. between the points in question. Under western classification newspaper supplements are described as "patent insides and newspaper supplements, folded (not sewed), in bundles." The commission found that the publication in question was sewed, and although it was a supplement it resembled more nearly a magazine than other supplements, such as the comic section. The commission decided, therefore, that the publication does not come within the description of supplements in a classification and is a magazine, and that the rate was properly assessed. (26 I. C. C., 395.)

#### Reparation Awarded.

*McLaughlin Motor Car Company, Ltd., v. Grand Trunk et al. Opinion by the commission:*

The commission found that the rate of 51 cents per 100 lbs. charged for the transportation of automobile chassis, k. d. in carloads from Flint, Mich., to Oshawa, Ont., was unreasonable to the extent that it exceeded 37½ cents per 100 lbs., minimum weight 15,000 lbs. As this rate has been in force for over fifteen months, no order regarding a rate for the future was issued. (26 I. C. C., 315.)

*Central Commercial Company v. Atchison, Topeka & Santa Fe et al. Opinion by the commission:*

The complainant attacks as unreasonable the rate charged by the defendant for the transportation of petroleum residuum, or road oil from Coffeyville, Kansas, to Hastings, Nebraska. Reparation is asked. The commission found that the present rate, which is 33.1 cents per 100 lbs., is unreasonable to the extent that it exceeds 21 cents per 100 lbs. and prescribed that rate for the future. (26 I. C. C., 373.)

*Pacific Stationery & Printing Company v. Oregon-Washington Railroad & Navigation Company et al. Opinion by the commission:*

The complainant contends that the double first class rate charged for the transportation of less than carload shipments of rotary mimeographs from Chicago to Portland, Ore., is unreasonable and asks for reparation. The commission found that the rate in question was unreasonable to the extent that it exceeded one and one-half times first class rate and prescribed that rate for the future. (26 I. C. C., 370.)

*Diamond Crystal Salt Company v. Michigan Central et al. Opinion by the commission:*

The complainant ships salt over a through route from St. Clair, Mich., to Savannah, Ga., and Jacksonville, Fla., the traffic moving by rail to Baltimore, Md., and thence via the Merchants & Miners Transportation Company by water to destination, on a through rate of 29½ cents per 100 lbs., of which 15 cents is the separately established rate of the water carrier applied to the through transportation. Upon petitions alleging the unreasonableness of the through rate and charges and asking for reparation, the commission found that the through rate on salt over the route in question was unjust and unreasonable to the extent that the separately established rate of the water carrier applied to the through transportation, 15 cents per 100 lbs., exceeds 12 cents per 100 lbs. (26 I. C. C., 434.)

*Goodman Manufacturing Company v. Pennsylvania Railroad et al. Opinion by the commission:*

The complainant contends that the rate charged by defendant for transportation of machinery from Ridgway, Pa., to Rentchler, Ill., was unreasonable. Reparation is asked. In absence of a joint through rate there was charged a rate of 40.4 cents per 100 lbs., the factors of which were a fifth class rate of 21 cents to Louisville, Ky., a commodity rate of 15 cents from Louisville to Belleville, Ill., a sixth class rate of 4.4 cents, Belleville to Rentchler. The complainant said that there were several available routes over which there were lower combinations than via the route of movement and that the shipment should have been forwarded to Belleville direct via the Louisville & Nashville over which route there was a combination rate of 29.4 cents per 100 lbs. The commission decided that the shipment was misrouted by the initial carrier and that in consequence the complainant was compelled to pay an unreasonable rate. (26 I. C. C., 423.)

#### Rate on Fertilizer Reduced.

*Meridian Fertilizer Factory v. Texas & Pacific et al. Opinion by Commissioner McChord:*

The complainant contends that the rates on fertilizer from Shreveport, La., to various destinations in Arkansas are unreasonable and unjustly discriminatory to the extent that they exceed the rates from Memphis and St. Louis to the same destinations. The complainant argued that though there was a good market for commercial fertilizer in Arkansas, the rate adjustment from Shreveport to Arkansas points was so high that the complainant was deprived of its just share of sales in that state, even at points closer to Shreveport than to the competitive market. The commission decided that reduction should be made in most of the rates on fertilizer from Shreveport to Arkansas points and that these reductions would produce a larger volume of traffic to the carriers. Reasonable rates for the future were prescribed. (26 I. C. C., 351.)

#### Rate on Cottonseed Not Increased.

*In re advances in rates on cottonseed from points in Oklahoma to Little Rock, Ark. Opinion by Commissioner Prouty:*

The suspended tariffs proposed to cancel joint rates from points on the Missouri, Oklahoma & Gulf in Oklahoma to Little Rock, Ark. The commission found that the advances in the rates which would be effected by the cancellation of these joint rates would seriously affect the shippers, and ordered the defendant to cancel the suspended tariff. (26 I. C. C., 211.)

#### Hamburg, Mich., Discriminated Against.

*Hiram G. Beach v. Ann Arbor Railroad et al. Opinion by the commission:*

The complainant alleged that Hamburg, Mich., was discriminated against because the defendant maintained a round trip week-end fare of \$1.25 during the summer season from Toledo, Ohio, to Whitmore Lake and Lakeland, Mich., which are summer resorts, while denying this low fare to Hamburg, Mich., a summer resort located between Whitmore Lake and Lakeland. The commission found that this practice constituted a discrimination against Hamburg and ordered that in future the defendant desist from charging lower or more advantageous fares from Toledo to Whitmore Lake and Lakeland than to Hamburg. (26 I. C. C., 410.)

#### Rates on Phosphate Rock Not Increased.

*In re investigation and suspension of advances in rates by carriers for the transportation of phosphate rock in bags from points in Tennessee to Norfolk, Va., and other points. Opinion by the commission:*

The proposed advanced rates upon crude ground phosphate rock in carloads transported from points in Tennessee to New England and middle eastern states were found to be unreasonable and the present rates were ordered to be maintained as maxima for two years. The carriers were ordered to cease and desist from discriminating in rates between ground phosphate rock in bulk and ground phosphate rock in bags. (26 I. C. C., 377.)

#### Shipment Misrouted.

*Pole Stock Lumber Company v. Gulf & Ship Island et al. Opinion by the commission:*

The complainant forwarded a number of carloads of lumber from points in Mississippi and Louisiana to South Chicago, Ill., and directed routing via Louisville, Ky. A combination rate of 30 cents was applied. At the same time defendants, with the exception of the New Orleans & Northeastern, were parties to a tariff naming a joint rate of 24 cents from points of origin to destination which reserved to the carriers the right to route all shipments of lumber and articles taking the same rates, but the tariff did not specify any particular routes. Adhering to the principle announced in *Kettler Lumber Co. v. G. & S. I. R. R. Co.*, 21 I. C. C., 14, the commission decided that in the absence of routing directions in the tariff the joint rate of 24 cents was applicable to such shipments as moved over the lines of defendants concurring in said joint rate; that as to such shipments participated in by the New Orleans & Northeastern it was the duty of the initial carrier, a party to the joint rate of 24 cents, to



so route the shipments as to secure to them the joint rate, and that not having done so the shipments were misrouted. Reparation was awarded. (26 I. C. C., 451.)

#### Hard Wood Lumber Rates Reduced.

*Blue Grass Lumber Company et al. v. Louisville & Nashville et al.*

*Robinson Lumber Veneer & Box Company et al. v. Louisville & Nashville et al.*

*S. C. Major v. Louisville & Nashville et al. Opinion by the commission:*

As these three cases involve attacks on the rates on hard wood lumber from points on the Louisville & Nashville in Alabama, south of the Tennessee river, to eastern seaboard territory and interior eastern points, they were consolidated and disposed of in one report. The commission found that the rates in question were unreasonable to the extent that they exceeded the rates on yellow pine between the same points by more than 2 cents per hundred pounds and prescribed those rates for the future. (26 I. C. C., 438.)

#### Through Rates on Shipments Reconsigned.

*New Kentucky Coal Company v. Louisville & Nashville et al. Opinion by the commission:*

The complainant shipped coke in carloads via defendants' lines from certain Virginia points to Chicago, and thence, upon reconsignment, to various points beyond. Transportation charges were collected on basis of the rates to and from Chicago. Through rates were in force at the time, which were lower than the combinations on Chicago. The complainant claims that the through rates should have been applied. The commission found that as to the shipments that moved to Chicago via the Louisville & Nashville and Chicago, Indianapolis & Louisville lines the through rates were applicable and should have been charged. Reparation was awarded. Under the tariffs of the Louisville & Nashville and the Cleveland, Cincinnati, Chicago & St. Louis, reconsignment at Chicago on the basis of the through rates was not authorized, and reparation on these shipments was denied. (26 I. C. C., 417.)

#### STATE COMMISSIONS.

It was announced informally at a meeting of the Louisiana State Railroad Commission, in New Orleans, last week, that the commission would notify all railroads in the state on which more than one train a day is run, to install block signals. The Southern Pacific and the New Orleans & Northeastern already have considerable installations of automatic block signals.

The Iowa board of railroad commissioners will hold a general rate and classification hearing at Des Moines on May 14, and a special hearing on the subject of demurrage rules on May 13. The questions to be considered are, proposed changes in the Iowa rules, to agree with the interstate rules now in effect, and a proposed increase in the demurrage charge from \$1 to \$3.

The railroad commission of Colorado has handed down a decision ordering reductions ranging as high as 28½ per cent. in the rates on coal from the northern Colorado fields to Denver on the Colorado & Southern, the Chicago, Burlington & Quincy, and the Union Pacific. Commissioner Kendall issued a dissenting opinion in which he says that while he believes the rates are now too high, the reduction ordered is excessive.

#### COURT NEWS.

The Southern Illinois Coal & Coke Company has filed suit against the Illinois Central for damages amounting to \$597,270 because of losses said to have been sustained by the company through failure of the road to provide it with enough cars from August, 1909, to date.

In the Federal court at Minneapolis, April 1, the Minneapolis, St. Paul & Sault Ste. Marie and the Russell-Miller Milling Company pleaded guilty to giving and receiving illegal rebates, and were fined \$5,000 each. The offenses were committed in connection with shipments of grain stopped at Minneapolis for milling.

#### REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF JANUARY, 1913.

Name of road.	Average mileage operated during period.	Operating revenues				Operating expenses				Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total, inc. misc.	Maintenance of way and structures.	Of equipment.	Traffic.	Trans- portation.	General.	Total.				
Georgia, Southern & Florida.....	395	\$122,561	\$76,734	\$224,797	\$25,728	\$38,773	\$8,518	\$94,512	\$8,362	\$176,393	.....	\$10,760	\$37,644	\$11,086
International & Great Northern.....	1,160	630,130	186,841	881,213	130,796	150,944	30,580	420,027	32,832	765,179	.....	30,000	83,213	—95,795
Minneapolis & St. Louis.....	1,586	639,093	137,930	827,769	107,775	105,989	18,399	333,305	20,207	585,675	—62	32,305	209,727	271,078
New Orleans, Mobile & Chicago.....	547½	158,515	25,894	198,594	37,904	24,696	4,057	93,795	10,154	170,606	—106	7,490	20,392	—31,696
Oahu Ry. & Land Co.....	101½	73,586	23,289	102,900	8,069	6,091	573	22,416	4,383	42,032	2,494	6,500	56,862	6,688
St. Louis Southwestern.....	906½	593,085	127,125	761,465	105,719	97,365	30,655	159,781	30,172	423,692	—509	26,796	310,468	157,348
Ulster & Delaware.....	129	39,539	13,856	56,651	18,464	13,536	907	30,967	3,080	56,954	165	3,300	—3,438	6,272
Georgia, Southern & Florida.....	395	\$786,796	\$507,152	\$1,491,573	\$180,262	\$286,884	\$54,234	\$598,369	\$65,894	\$1,185,643	.....	\$80,974	\$224,956	—\$61,459
International & Great Northern.....	1,160	5,301,557	1,619,103	7,347,717	945,698	940,638	183,950	2,855,996	227,140	5,153,422	—\$15,585	210,000	1,968,710	.....
Minneapolis & St. Louis.....	1,586	4,482,207	1,159,126	5,978,797	780,117	741,576	123,538	2,269,186	146,796	4,061,213	—252	218,066	1,699,266	835,258
New Orleans, Mobile & Chicago.....	547½	1,174,722	216,697	1,479,369	234,287	149,417	24,040	528,788	57,269	993,801	—463	32,427	452,678	62,982
Oahu Ry. & Land Co.....	101½	484,732	158,646	687,945	63,843	43,551	4,127	145,644	32,034	289,199	21,011	42,516	377,241	47,657
St. Louis Southwestern.....	906½	3,938,025	953,237	5,163,300	619,232	723,142	206,267	1,174,678	182,217	2,905,536	—5,069	171,222	2,081,473	328,569
Ulster & Delaware.....	129	402,792	259,610	697,434	94,146	90,856	9,301	283,458	18,007	495,768	501	23,100	179,067	—10,181

Average mileage operated during previous period—1404; 299; 3843.

— Indicates Deficits, Losses and Decreases.

SEVEN MONTHS OF FISCAL YEAR, 1913.

## Railway Officers.

### Executive, Financial and Legal Officers.

Lewis Lukes has been appointed assistant to the president of the Canadian Northern, with headquarters at Toronto, Ont.

Joseph W. Jamison has been appointed general attorney of the Missouri, Kansas & Texas for the state of Missouri, with headquarters at St. Louis, Mo., succeeding Lee W. Hagerman, resigned.

The jurisdiction of the officials of the Illinois Central has been extended over the Chicago, Memphis & Gulf. M. A. Chambers, auditor of disbursements of the latter road, has been appointed auditor and freight claim agent, with headquarters at Dyersburg, Tenn.

H. A. Scandrett, who has been interstate commerce attorney of the Harriman Lines at Chicago, has been appointed interstate commerce attorney of the Union Pacific, Oregon Short Line and Oregon-Washington Railroad & Navigation Company, with headquarters at Omaha, Neb., effective April 1.

The following appointments have been announced on the Chicago, Milwaukee & St. Paul: W. F. Dudley has been made auditor of traffic; G. J. Bunting and J. Welch are assistant general auditors of material accounts; W. T. Carroll, assistant freight auditor; August Jacobs, assistant ticket auditor; J. A. Mulhall, assistant auditor of expenditures; J. S. Butler, assistant auditor of material accounts, and John Williams, assistant car accountant.

Edward Beecher Pierce, whose appointment as auditor of the Missouri, Kansas & Texas has already been announced in these columns, was born July 3, 1873, at Leavenworth, Kan. He was graduated from the Leavenworth (Kan.) high school and began railway work in February, 1894, in the accounting department of the Kansas City, Fort Scott & Memphis. From July, 1900, to June, 1904, he was in the accounting department of the St. Louis & San Francisco at St. Louis, Mo., and on July 1 of the latter year was made auditor and freight claim agent of the north Texas lines of the Frisco, including the Ft. Worth & Rio Grande and the St. Louis, San Francisco & Texas, with office at Ft. Worth, Tex. He resigned on March 17 to become auditor of the Missouri, Kansas & Texas, with headquarters at St. Louis, as above noted.

Benjamin Akerly Dousman, whose appointment as general auditor of the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, has already been announced, was born March 21, 1859, at Milwaukee, Wis. He was educated in the public and high schools of Milwaukee, and began railway service April 19, 1879, with the Chicago, Milwaukee & St. Paul as junior clerk in the car accountant's office. A year later, in May, 1880, he went to the auditing department in charge of freight accounts, and in November of that year he was transferred to general accounts. On July 6, 1908, Mr. Dousman became assistant general auditor, which office he filled for two years, when he was made assistant auditor, July 1, 1910. He held the latter position until he was promoted to that of general auditor on March 15 of this year. Mr. Dousman's entire railway service of 34 years has been with the Chicago, Milwaukee & St. Paul. Mr. Dousman has jurisdiction also over the Bellingham & Northern, the Tacoma Eastern and the Gallatin Valley.



B. A. Dousman.

### Operating Officers.

E. Dowling, trainmaster of the Atchison, Topeka & Santa Fe at Las Vegas, N. M., has been appointed assistant division superintendent at Dodge City, Kan.

J. R. Pickering, acting superintendent of car service of the Rock Island Lines, has been appointed superintendent of car service, with headquarters at Chicago; effective April 1.

William E. Morris, formerly assistant general manager of the Chicago & North Western, has been appointed general manager of the Denver Northwestern & Pacific, with headquarters at Denver, Colo.

W. B. Denham, general manager of the Georgia & Florida, with office at Augusta, Ga., having resigned, all officers heretofore reporting to the general manager will in future report to B. W. Duer, vice-president, in charge of operation, with headquarters at Augusta.

F. R. Blunt, formerly superintendent of the Smithville district of the Missouri, Kansas & Texas, has been appointed general manager of the Palacios, San Antonio & Pecos Valley, which is under construction in southern and western Texas. The headquarters of the company are at Yoakum, Tex.

William Mosby has been appointed superintendent of transportation of the St. Louis Southwestern Railway Lines, with headquarters at Tyler, Tex., succeeding F. J. Hawn, who has been appointed superintendent of the Ft. Worth division of the St. Louis Southwestern of Texas, with office at Mt. Pleasant, Tex., in place of E. Richards, who has been made superintendent of the St. Louis Southwestern, with headquarters at Pine Bluff, Ark., succeeding E. A. Peck, deceased.

Alfred H. Egan, superintendent of the Kentucky division of the Illinois Central, has been appointed general superintendent of the Yazoo & Mississippi Valley, with headquarters at Memphis, Tenn., succeeding George W. Berry, who has been appointed terminal superintendent of the Illinois Central, with headquarters at Chicago, with jurisdiction between South Water street and Matteson and between Twelfth street and Parkway, in place of James H. Brinkerhoff, resigned. Lewis W. Baldwin, engineer of maintenance of way, succeeds Mr. Egan as superintendent of the Kentucky division, with headquarters at Louisville, Ky.

### Traffic Officers.

C. A. Rouse has been appointed general agent of the Erie Despatch, with headquarters at Indianapolis, Ind.

W. C. Elmer, chief clerk in the ticket offices of the Canadian Pacific at Chatham, Ont., has been appointed traveling passenger agent, with headquarters at Toronto, succeeding J. J. Brignall, resigned.

C. Hanson, division freight agent of the Texas & Pacific and the International & Great Northern at Ft. Worth, Tex., has been appointed joint live stock agent, with headquarters at Ft. Worth, to succeed D. C. Smith, resigned. George L. Moore, commercial agent at Oklahoma City, Okla., succeeds Mr. Hanson, and M. C. Bailey, traveling freight agent at Dallas, Tex., takes the place of Mr. Moore.

Garnett King, assistant general freight and passenger agent of the El Paso & Southwestern System, and the Morenci Southern, at El Paso, Tex., has been appointed general agent of these companies, with headquarters at St. Louis, Mo., succeeding J. I. Hazzard, resigned to accept service with another company, and the position of assistant general freight and passenger agent at El Paso, has been discontinued.

E. G. Spencer, commercial agent of the Kansas City Southern at Beaumont, Tex., has been appointed general agent of the freight department at Beaumont, Tex., in place of J. L. Boyd, resigned to engage in other business. J. C. Walker, traveling freight agent, with headquarters at Shreveport, La., succeeds Mr. Spencer. S. A. Martin, traveling freight agent of the St. Louis Southwestern at Shreveport, succeeds Mr. Walker.

### Engineering and Rolling Stock Officers.

John E. Gardner has been appointed electrical engineer of the Chicago, Burlington & Quincy, with headquarters at Chicago.



D. C. Ross has resigned as master car builder of the Michigan Central, effective April 1, and will reside at his summer home at Algonac, Mich.

W. F. Steffens has been appointed assistant chief engineer of the Chesapeake & Ohio and the Chesapeake & Ohio of Indiana, with office at Richmond, Va.

W. J. McLean, master mechanic of the Duluth, Winnipeg & Pacific at West Duluth, Minn., has been appointed master mechanic of the Kettle Valley Railway, with headquarters at Penticton, B. C.

H. M. Taylor, director of construction of the National Railways of Mexico, with headquarters at Mexico City, Mex., has resigned and his former position has been abolished. All officers and employees who have hitherto reported to Mr. Taylor will in future report to G. P. DeWolf, chief engineer of construction.

Daniel J. Brumley, engineer of construction of the Illinois Central and the Yazoo & Mississippi Valley, has been appointed engineer of maintenance of way of those roads, with headquarters at Chicago, to succeed Lewis W. Baldwin, transferred. Fred L. Thompson, engineer of bridges and buildings, succeeds Mr. Brumley, with headquarters at Chicago, and Maro Johnson, assistant engineer of bridges, takes Mr. Thompson's place, with office at Chicago.

Maro Johnson, who has been appointed engineer of bridges and buildings of the Illinois Central and the Yazoo & Mississippi Valley, with headquarters at Chicago, was born at Iowa

City, Iowa, in 1877, and graduated from the engineering department of the University of Iowa in 1898. The same year he entered the service of the Illinois Central as masonry inspector, and subsequently held various positions on that road until 1905, when he went to the Indianapolis Southern, a subsidiary of the Illinois Central, as resident engineer. Two years later he returned to the service of the Illinois Central as resident engineer on the track elevation work at Grand Crossing, Ill. In September, 1912, he was promoted to assistant engineer of bridges, and now becomes engineer of



M. Johnson.

bridges and buildings of the same road as above noted.

#### OBITUARY.

Peter S. Archibald, who was chief engineer of the Intercolonial Railway from March, 1878, to 1898, died on March 16, at his home in Moncton, N. B. He was born on March 18, 1848, at Truro, N. S., and began railway work in July, 1867, in the engineering department of the Intercolonial Railway, and held various positions in that department until his promotion to chief engineer. He resigned from that position in 1898, to become a consulting engineer.

Caspar Buhner, formerly roadmaster of the Lake Shore & Michigan Southern at Sandusky, Ohio, and later superintendent of the tie and timber-treating plant of that road near Toledo, died at his home in the latter city on March 23, aged 58 years. Mr. Buhner was connected with the Lake Shore some 35 years and had been roadmaster about 30 years. He retired about two years ago owing to ill health. Mr. Buhner was the inventor of the Carnegie steel tie and one or two reinforced concrete ties.

J. W. Petheram, formerly from October, 1893, to the latter part of 1909, chief engineer of the Missouri, Kansas & Texas Railway of Texas, died on March 26 at his home in Dallas, Tex., aged 70 years. Mr. Petheram was born in Largo, Scotland, and was educated at Madras College at St. Andrews, Scotland. He

entered railway service in June, 1873, as resident engineer of the Credit Valley Railway of Canada, and from February, 1875, to August, 1879, was assistant engineer of the same road. From April, 1881, to January, 1884, he was successively chief engineer of the Georgian Bay & Wellington and assistant engineer of the Chicago & West Michigan, and was then until January, 1888, chief engineer of the latter road. Subsequently to October, 1893, he was general roadmaster of the Missouri, Kansas & Texas of Texas, and was made chief engineer on the latter date, which position he held for about 16 years, when he sustained a stroke of paralysis, from which he never fully recovered.

James McCrea, who, up to the beginning of the present year, was president of the Pennsylvania Railroad, died at his home in Haverford, Pa., near Philadelphia, on the night of March 28, at the age of 65. He had been in failing health for several weeks. An account of Mr. McCrea's life, with a portrait, was given in the *Railway Age Gazette* on November 22 last, when he resigned his position as president. Mr. McCrea was born in Philadelphia, May 1, 1848, and was educated at the Pennsylvania Polytechnic College. He began his railway service as rodman and assistant engineer on one of the minor lines of the Pennsylvania system, and his whole active life was passed in the service of that company. He served on the western lines of the company 25 years. Mr. McCrea leaves a wife, two sons and a daughter. One of the sons, James A. McCrea, is general manager of the Long Island Railroad, at New York City. The funeral was held on Monday of this week at St. Mary's Protestant Episcopal Church, Ardmore, Pa., a large number of railroad officers and financiers from Philadelphia, New York and other cities being present. All traffic on the Philadelphia Division of the road was suspended for three minutes at the time of the burial.

George T. Nicholson, vice-president in charge of traffic of the Atchison, Topeka & Santa Fe System, with headquarters at Chicago, died in Los Angeles, Cal., on March 30, following an operation.

Mr. Nicholson was born July 1, 1856, at Belvidere, N. C. He was educated at the Kansas State University and began railway work in 1882 as clerk in the general passenger and ticket office of the Atchison, Topeka & Santa Fe. He was successively rate clerk, chief rate clerk, chief clerk, assistant general passenger and ticket agent and general passenger agent to February 1, 1897, when he left the Santa Fe to become general passenger agent of the St. Louis & San Francisco. He returned to the Santa Fe in May, 1898, as passenger traffic manager of the entire



G. T. Nicholson.

system, and in October, 1905, he was elected vice-president in charge of traffic. Funeral services are to be held at Lawrence, Kan., on Friday. The Santa Fe ran a special train Thursday night to accommodate railway men who wished to attend.

**PARLOR CAR MAIDS IN PRUSSIA.**—The Prussian minister of public works has had occasion to chide the house maids (or car maids) who are expected to keep everything spick and span in the cars which correspond to our drawing-room cars. They have not shown proper zeal in attending to their duties, he says. They must maintain extreme cleanliness in all parts of the car; see that fresh drinking and washing water, and clean towels and soap are provided before the supply is exhausted, and not remove them before the car reaches its final destination, as they have done too often. Conductors are made responsible for the proper service of these women, who are especially to see that the car is perfectly neat when transferred from a Prussian to a connecting railway.

## Equipment and Supplies.

### LOCOMOTIVE BUILDING.

THE NEW YORK CENTRAL LINES are in the market for 180 locomotives.

THE LEHIGH VALLEY is considering the purchase of 25 mikado locomotives.

THE ATLANTIC COAST LINE has ordered 11 Pacific type locomotives and 9 switching locomotives from the Baldwin Locomotive Works.

THE HAVANA CENTRAL has ordered 8 consolidation locomotives from the American Locomotive Company. The dimensions of the cylinders will be 20 in. x 26 in.; the diameter of the driving wheels will be 50 in., and the total weight in working order will be 154,000 lbs.

### CAR BUILDING.

THE ST. LOUIS & SAN FRANCISCO is in the market for 1,000 box cars, and 1,000 gondola cars. This company will also soon order some stock cars.

THE BALTIMORE & OHIO has ordered 1,500 all-steel, 50-ton hopper cars. This order was divided equally between the Pressed Steel Car Company, the American Car & Foundry Company and the Standard Steel Car Company. This company has also an option on 1,000 additional hopper cars.

THE ATLANTIC COAST LINE has ordered 12 all-steel, passenger coaches, 4 all-steel, combination passenger and baggage cars and 4 all-steel, combination mail and express cars from the Pullman Company, and 2 steel underframe passenger coaches, 2 steel underframe, combination passenger and baggage cars and 3 steel underframe, combination mail and express cars from the American Car & Foundry Company.

### IRON AND STEEL.

THE SEABOARD AIR LINE is in the market for 10,000 tons of rails.

THE BALTIMORE & OHIO is in the market for 5,000 tons of rails.

GENERAL CONDITIONS IN STEEL.—According to the *Wall Street Journal* the losses sustained by the steel plants in the Sharon, New Castle and Youngstown districts from the recent floods will not be as great as at first estimated. Heads of the different departments are optimistic and say that with a few exceptions the plants will be operated within a few days. In Sharon the North Works of the Carnegie Steel Company will be running the first of next week. The greatest loss sustained by the Carnegie Steel Company was at its coking plant in Farrell. It is feared that the entire plant will have to be rebuilt. Officers of the company estimate that the loss will be close to \$200,000. The blast furnaces are in good shape and the other mills were not extensively damaged. The shutting down of a number of plants and the poor transportation service will have its effect on the April shipments of the Steel Corporation, but it is not believed that the resulting decrease will exceed 200,000 tons if adequate freight service is speedily restored. Orders have been small recently, but prices continue to remain firm.

RAILWAYS AND COLLIERIES IN INDIA.—The Bengal Chamber of Commerce has addressed the government of India deprecating the acquisition of colliery land by railway companies. The chamber argues that railways have no right to embark on undertakings which can be more satisfactorily and efficiently managed by private companies. Five years ago the chamber raised this question but the government of India was not impressed by the argument and declared that it was its established policy to permit railways to own and operate collieries. A short time ago the railways had to choose between operating their own mines or increasing their freight charges, on account of the sharp advances in coal prices.

## Supply Trade News.

The Roberts & Schaefer Company, Chicago, has received a contract from the Western Maryland to build a large Holmen coaling station at Williams, W. Va.

Henry Jungerman, formerly in the motive power and inspection department of the Harriman Lines, has been made railway representative of Tate-Jones & Company, Inc., Pittsburgh, Pa.

Charles A. Lindstrom, chief engineer of the Pressed Steel Car Company, Pittsburgh, Pa., has been made assistant to the president, with headquarters in Pittsburgh; B. D. Lockwood, assistant chief engineer of the same company, has been made chief engineer; J. F. Streib, mechanical engineer of the company, has been made assistant chief engineer, and Felix Koch has been made mechanical engineer.

The Duff Manufacturing Company, Pittsburgh, Pa., has moved into its new plant and general office building on Preble avenue, Pittsburgh. The old works on Marion avenue have been dismantled. The new factory building has about 68,000 sq. ft. of floor space, and is located on a tract of ground approximately five acres. It has track connections with the Pennsylvania Railroad and the Baltimore & Ohio. This company is also planning to erect a new plant in the Chicago district, and one at either Windsor or Hamilton, Ont. Both of these plants are expected to be in operation in the fall of 1913.

The Federal Signal Company, New York and Troy, N. Y., last week bought the property of the American Railway Signal Company of Cleveland, Ohio, together with all the company's assets, and stock on hand. It also will carry out the unfinished contracts for construction. The principal contract on which the American company was engaged was for the installation of automatic block signals on 150 miles of single track, of the New York, Chicago & St. Louis in the state of Indiana. There are a number of smaller contracts on other roads. H. M. Abernethy, general manager of the American company will join the Federal company, with office in Cleveland.

H. F. Ball, special consulting engineer, with office in New York, and formerly vice-president of the American Locomotive Company, New York, has been made president of the Economy Devices Corporation, 30 Church street, New York, which has recently been formed. This company has taken over the business of the Radial Buffer Company, which company has been dissolved. Among the devices which will be marketed by the new company is the Radial engine and tender buffer. Mr. Ball entered the service of the Pennsylvania Railroad as an apprentice at Altoona, Pa., in 1884. Four years later he entered the drafting room at Altoona, and in 1890 was appointed chief draftsman of the car department of the Lake Shore & Michigan Southern.



H. F. Ball.

Two years later he was made general foreman of the car shops at Cleveland, Ohio, and in 1894 he was appointed general car inspector. In 1899 he was made mechanical engineer of the same road, and was promoted to superintendent of motive power, in February, 1902. In 1906 he left the Lake Shore to become vice-president of the American Locomotive Automobile Company; a few months later his jurisdiction was extended over the American Locomotive Company as vice-president in charge of engineering. In December, 1912, he left the American Locomotive Company to open an office as special consulting engineer. Mr. Ball was



president of the Central Railway Club in 1900, and of the American Railway Master Mechanics' Association in 1905-6.

President R. P. Lamont, of the American Steel Foundries, has submitted the annual report to the stockholders for the tenth fiscal period of the company for the calendar year ended December 31, 1912. The gross sales for the year were \$14,319,571.58, and the gross earnings from operations of plants and other income after deducting manufacturing expenses (which includes \$1,160,536.32 for repairs and maintenance), also selling, administration, head and district office and other expenses, were \$1,588,766.14. The net income of \$777,756.17 applicable to surplus shown on the balance sheet is the remainder after deducting all interest and \$322,506.90 for depreciation of fixed properties, also \$184,173.91 appropriated for the sinking fund. In comparing the earnings for 1912 with the preceding fiscal period, which showed a loss of \$259,030.92, it should be borne in mind that such period covered a term of 17 months, only the first few of which showed any profit. If the sales for 1912 be compared with the calendar year 1911, the change is far more pronounced as that 12 months' operations showed a loss of \$514,801.82. As shown by the balance sheet \$188,249.74 was charged to capital account during the year for new construction, additions, machinery equipment, etc., and in addition a further sum of \$135,624.56 was spent for replacements, minor additions, and improvements, and charged to the depreciation reserve. During the year equipment for the production of car couplers has been installed at East St. Louis, and at the Hammond plant a new building for the production of brake beams has been added. President Lamont says that the pronounced business depression of 1911 continued well into the following year, but about mid-summer a noticeable improvement in the volume of orders became apparent. The improvement, however, was not reflected in the company's earnings until two or three months later, hence the year's showing is largely the result of the operations for the last six months of the year. At the present time the volume of orders in hand is, with one exception, the largest in the history of the company.

#### TRADE PUBLICATIONS.

**CHICAGO & NORTH WESTERN.**—The passenger department has issued an illustrated booklet describing the special features of its new Overland Limited train that was put in service between Chicago and San Francisco on April 1.

**DENVER & RIO GRANDE.**—The passenger department has issued a special folder in German describing the city of Denver, and enumerating its principal points of interest in recognition of the Bundesturnfest, to be held in Denver in June.

**BRIDGES.**—The Strauss Bascule Bridge Company, Chicago, has issued an interesting booklet devoted to the Strauss direct lift bridge, an application of the counterbalancing mechanism of the Strauss bascule to the vertical lift bridge. The booklet contains a general description of the principles of this type of bridge, and is illustrated with drawings of various types that have been installed.

**PAINT.**—The Sherwin-Williams Company has published an attractive pamphlet containing a story entitled "Making Over Maybridge," which relates the experiences of a young city man who returns to his boyhood town after ten years and over the opposition of some of the more conservative old residents organizes a club to "brighten up" the town, by cleaning up refuse, painting old buildings, and otherwise making the town attractive.

**LOCOMOTIVE BOILERS.**—The Wm. H. Wood Loco. Fire Box and Tube Plate Company, Media, Pa., has published a folder entitled, Improvements in Locomotive Boilers Versus Regular Standard Boilers with Flexible Stays. In this folder are enumerated a number of results from tests which show the great efficiency of Wood boilers compared with boilers having flexible stays.

**THIRD CLASS SLEEPING CARS IN NORWAY.**—Norway follows the example of Sweden in ordering some third-class sleeping cars. They have three berths to a section, each 24 in. wide, and there are 12 sections to a car. These cars will weigh 76,000 lbs., and will cost \$8,800 each.

## Railway Construction.

**ARTESIAN BELT.**—An officer of this company, which operates a line from Macdona, Tex., to Christine, 43 miles, writes regarding the report that an extension is to be built from Christine, that contracts were recently let and grading work is now under way on an extension southeast, 17 miles. The work involves handling 15,000 cu. yds. to the mile. Maximum grades will be 1 per cent., and maximum curvature 1 deg. The company expects to develop a traffic in oil, coal, cotton and garden truck. (March 28, p. 779.)

**ATCHISON, TOPEKA & SANTA FE.**—According to press reports plans are being made for double tracking work through a mountainous section from Victorville, Cal., south to Summit, 19 miles.

**BOSTON ELEVATED.**—A contract for the construction of section B, of the Dorchester tunnel, at Boston, Mass., has been given to the Hugh Nawn Contracting Company, Roxbury, at \$351,048. The contract covers about 500 lineal feet of a street railway passenger tunnel to be operated by the Boston Elevated.

**BUFFALO, ROCHESTER & PITTSBURGH.**—An officer writes that a contract has been given to the Miller Construction Company, Lock Haven, Pa., for grading and masonry work on a five-mile branch at Lucerne, Pa.; and a contract has been given to Lane Brothers Company, Altavista, Va., for grading and masonry work on twelve miles of second track and grade revision between Rochester, N. Y., and Scottsville. (March 28, p. 779.)

**CANADIAN PACIFIC.**—An officer tells us that a contract for grading the Kootenay Central has been let to Foley Bros., Welch & Stewart, on the section from a point 60 miles south of Golden, B. C., to Shookumchuk, about 65 miles. (March 28, p. 779.)

**CHAMBERSBURG & SHIPPENSBURG.**—Application has been made for a charter in Pennsylvania, by this company with a capital of \$250,000 and headquarters at Chambersburg, Pa. The plans call for building from Red Bridge Park, Chambersburg, north and east through Greene and Southampton townships, Franklin county, following in a general direction the line of the Harrisburg, Carlisle & Chambersburg turnpike to the western line of Shippensburg, nine miles. Thad. M. Mahon, president; W. H. Fisher, W. Alexander, H. B. McNulty, J. G. Schaff and J. F. Shank are directors.

**CHICAGO, BURLINGTON & QUINCY.**—This company has authorized the construction of second track from McCartney, Wis., to Bagley, 23 miles; Prairie du Chien to Charme, 7 miles; De Soto to Victory, 6 miles, and Fountain City to Alma, 14 miles, at an estimated cost of about \$3,800,000. Third track will also be built from Downers Grove, Ill., to Aurora, 11 miles, at an estimated cost of \$500,000.

Grading work for second track, parallel with present alinement between Pishgah, Ill., and Virden, 23 miles, is now under way. The grading is being done by J. E. Finnegan.

**GULF, TEXAS & WESTERN.**—This company has made two reconnaissance surveys, it is said, for the proposed extension west from Seymour, Tex. One of the surveys extends northwest from Seymour to Floydada, about 150 miles, where connection could be made with the branch of the Santa Fe that runs to Plainview. The other survey was made from Seymour to Crosbyton, about 125 miles. At Crosbyton the line would connect with the Crosbyton-Southplains, which runs to Lubbock. The G., T. & W. recently finished work on the section from Jacksboro south to Salesville, 24 miles. (February 28, p. 411.)

**KOOTENAY CENTRAL.**—See Canadian Pacific.

**MONROE, LOUISIANA & GULF.**—Incorporated in Louisiana with \$1,000,000 capital to construct or purchase a line from Monroe southwest to Winnfield, with New Orleans connection. Financial arrangements have been made. J. M. Parker, New Orleans, is president; T. J. Sheldon, is vice-president, and Percy Sandel, is secretary and treasurer.

**OREGON SHORT LINE.**—An officer writes that the company expects to begin construction work some time during the next few months on the extension of the Twin Falls branch south from a point in Idaho to a connection with the Central Pacific in Nevada. (March 21, p. 692.)

**PLATEAU VALLEY.**—According to press reports financial arrangements have been made to build a line between Grand Junction, Colo., and Collbran, 48 miles. The company plans to use the tracks of the Denver & Rio Grande from Grand Junction to Palisades, from which place a new line is to be built east through the canyon of Plateau creek via Mesa, Molina and Plateau City to Collbran. Preliminary surveys have been made. It will cost about \$1,000,000 to build the line. Jacob Yeckel, president, and A. J. Halter, vice-president, Denver. (January 31, p. 231.)

**SUBURBAN RAILWAY.**—A bill has been passed by the legislature of New Brunswick authorizing this company to build suburban lines from St. John, N. B., as follows: To Loch Lomond, 10 miles; to Rothesay, 9 miles; to Millidgeville, 3 miles, and to Westfield, 14 miles. The bill provides that the company must spend \$50,000 in construction the first year, the same amount the second year, and \$100,000 the third year, besides making provision for hydro-electric power.

**TEXAS ROADS.**—Plans are being made to build from Whiteflat, Tex., south to a connection with the Quanah, Acme & Pacific. This project is being financed by ranchmen and land owners along the route of the proposed line. It will be built and operated as an independent line, and it is planned to ultimately extend it north to Memphis, and south to Spur, in all about 100 miles.

#### RAILWAY STRUCTURES.

**ASHLAND, WIS.**—It is announced that the Chicago & North Western will build another ore dock east of its present docks. The new dock will be of steel and concrete, and will cost about \$1,000,000.

**BUTTE, MONT.**—Work is to be started soon on the erection of a new passenger station.

**CARLTON, MINN.**—The Northern Pacific has announced its intention of constructing a large terminal at this point, to be used as a storage and makeup yard to relieve the congestion at Duluth. A similar terminal will be constructed at White Bear, Minn., to relieve the pressure of the Twin Cities.

**DEMOPOLIS, ALA.**—The Southern Railway is asking for bids for building a new freight station at Demopolis, to take the place of the old structure recently burned. The new building will be of brick construction with fireproof roof 40 ft. x 153 ft. There will also be an open platform 48 ft. x 60 ft., and the improvements will include loading platforms, paved teamways, and the necessary track changes.

**DICKERSON RUN, PA.**—The Pittsburgh & Lake Erie has given a contract, it is said, for building a roundhouse, a shop structure, a storeroom and a power house at Dickerson Run.

**DU BOIS, PA.**—The Buffalo, Rochester & Pittsburgh will make improvements to the shops at Du Bois, it is said, to include an extension to the erecting shop, 250 ft. x 137 ft.; an addition to the power house; an extension to the boiler making shop, 150 ft. x 200 ft.; a pattern shop will be built 64 ft. x 70 ft., two stories high, and another building 35 ft. x 70 ft. will be put up. The company it is said, has also under consideration plans for the construction of a steel car plant, which calls for a structure 192 ft. x 400 ft., equipped with eight tracks.

**FAUNSDALE, ALA.**—Bids are wanted by the Southern Railway for building a combined freight and passenger station at Faunsdale, to take the place of the old station destroyed by fire. The new building will be of frame construction with tile roof.

**PEMBINA, N. D.**—The Canadian Northern will enlarge its shops and increase its yard capacity.

**RIVERSIDE, PA.**—The Buffalo, Rochester & Pittsburgh has given a contract to the American Bridge Company, New York, for a double track bridge, to be built over the Allegheny river at Riverside.

**WEST TOLEDO, OHIO.**—The Lake Shore & Michigan Southern will build two roundhouses and a power plant at its Air Line Junction yards.

**WHITE BEAR, MINN.**—See Carlton, Minn.

## Railway Financial News.

**ATCHISON, TOPEKA & SANTA FE.**—Under the law which has been passed by the Texas legislature, the Gulf, Colorado & Santa Fe, a subsidiary of the Atchison, Topeka & Santa Fe, is to operate the Gulf & Interstate, the Texas & Gulf, the Concho, San Saba & Llano Valley and the Sweetwater-Coleman division of the Pecos & Northern Texas.

**BOSTON & ALBANY.**—The Massachusetts Railroad Commission has been asked to authorize the issue of \$3,627,000 5 per cent. bonds of October 1, 1913-1963. The proceeds of the sale of these bonds is to be used to refund a like amount of 4 per cent. bonds due October 1, 1913.

**CALIFORNIA, SHASTA & EASTERN.**—The Railway Commission of California has authorized this company to issue \$568,000 bonds and \$349,500 stock. The securities are to be sold at not less than 80. The original application was for an issue of \$797,000 bonds and \$1,075,600 stock.

**CORNWALL & LEBANON.**—The Pennsylvania Railroad has bought nearly all of the \$800,000 stock of this company, of which previously \$542,500 was owned by the Pennsylvania Steel Company, and most of the remainder by the Lackawanna Steel Company.

**GALVESTON, HOUSTON & HENDERSON.**—The issue of \$2,000,000 new first mortgage 5 per cent. bonds, which was proposed, and which has been previously mentioned in these columns, has been postponed, owing to the company's inability to adjust the necessary formalities with the Texas railroad commission, holders of the \$2,000,000 first mortgage 5 per cent. bonds, which were due April 1, and who were offered the privilege of exchanging their bonds for new bonds, received cash on April 1.

**HOUSTON & BRAZOS VALLEY.**—See Missouri, Kansas & Texas.

**MISSOURI, KANSAS & TEXAS.**—This company has bought an interest in the Houston & Brazos Valley. Included in the purchase is trackage rights over the International & Great Northern between Anchor, Tex., and Houston. This gives the M. K. & T. an additional outlet on the Gulf of Mexico at the terminus of the Houston & Brazos Valley at Freeport.

**RUTLAND.**—The New York Public Service Commission, Second district, has authorized the company to issue \$210,000 equipment trust certificates, to be sold at 94½. The proceeds of the sale is to pay for six freight locomotives, one switching locomotive, one combination mail and baggage car, two baggage cars, three smoking cars, two first class coaches and one kitchen coach.

**RAILWAY CONSTRUCTION IN AUSTRALIA.**—Good progress is being made with the new railway lines under construction. The line from Bairnsdale to Orbost, 60 miles, will open up a large area of productive country, which hitherto has been handicapped by the absence of transit facilities. About 800 men are employed on the work and bridges, culverts and earthworks have been laid down for a distance of 40 miles from Bairnsdale. The section to Bruthen, 20 miles from the head of the existing line, will be first opened to traffic. A temporary bridge has been constructed over the Mitchel river and another of a more permanent character spans the Nicholson river.

**BRANCH LINE FOR INDIA.**—The branch line which is under construction from Bhairab-Bazaar to Tangu, which is a continuation of the Akhaura-Bhairab branch of the Assam-Bengal Railway, continues to make good progress, and it is expected that the line will be opened to traffic in April, 1914. About 85 per cent. of the earthwork has been completed and about 80 per cent. of the major bridges. The rails are also laid over a part of this branch. There have been labor difficulties on the line owing to the coolies finding work on railway construction nearer home and partly to the heavy rains in the recruiting districts which facilitated cultivation and reduced the annual emigration. It is intended to cross the Magna river by means of a car ferry. This branch line joins the Dacca branch of the Eastern Bengal State Railway at Tong and there will then be through communication between Chittagong and the rich districts of Dacca and Mymensingh.